Bay of Fundy Resource Inventory

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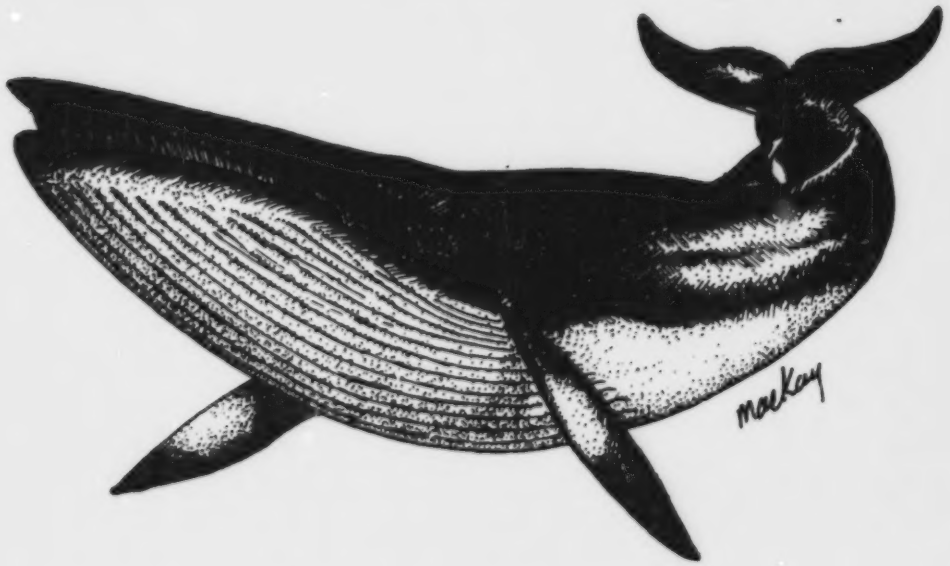

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FINAL REPORT TO THE NEW BRUNSWICK DEPARTMENT OF FISHERIES, FREDERICTON, N.B.

MARINE RESEARCH ASSOCIATES LTD., LORD'S COVE, DEER ISLAND, N.B., CANADA

THE WOLVES ISLANDS

FINAL REPORT
TO
THE NEW BRUNSWICK DEPARTMENT OF FISHERIES

BAY OF FUNDY RESOURCE INVENTORY
VOL 5
THE WOLVES ISLANDS

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Dated: January 31, 1979

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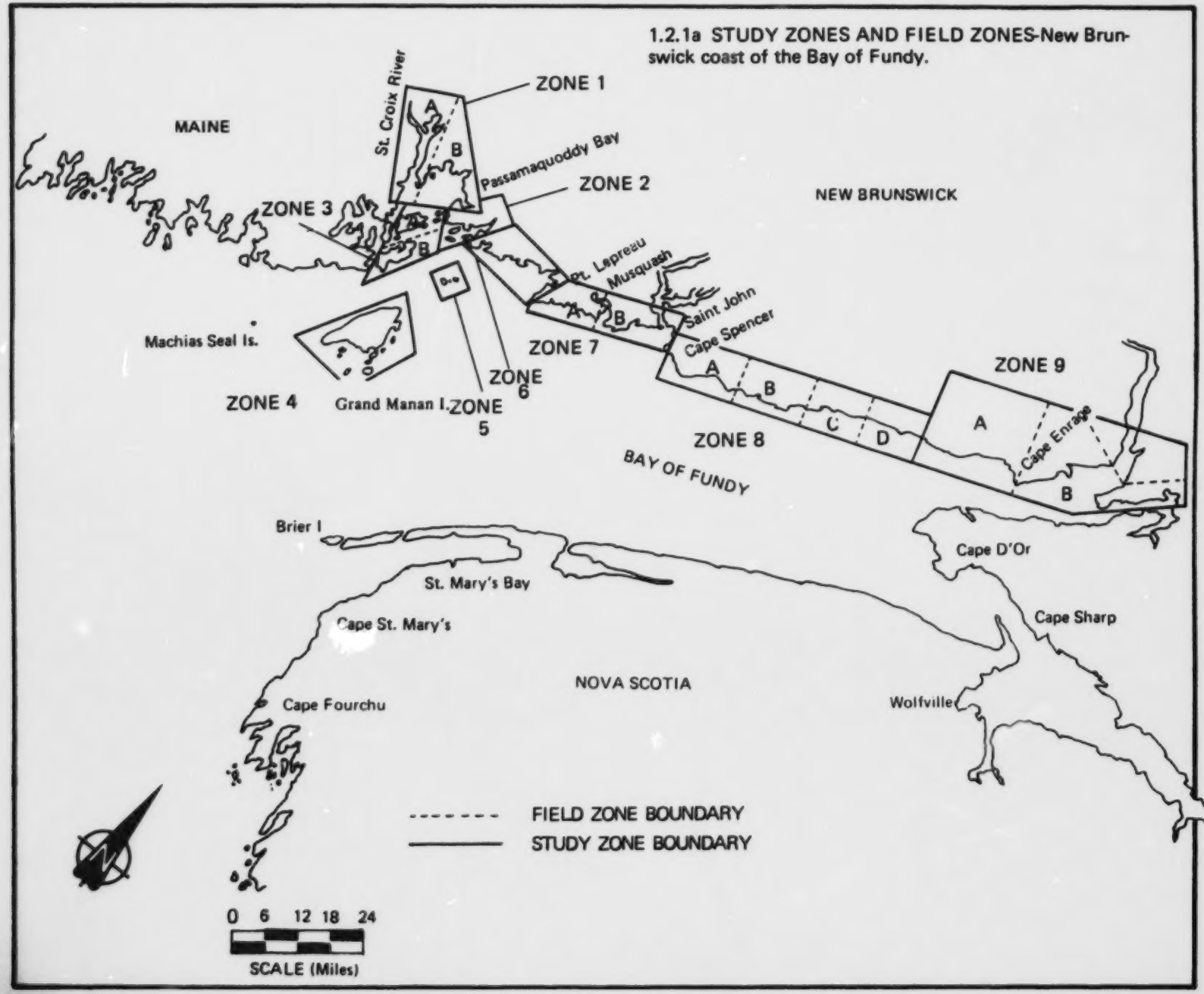
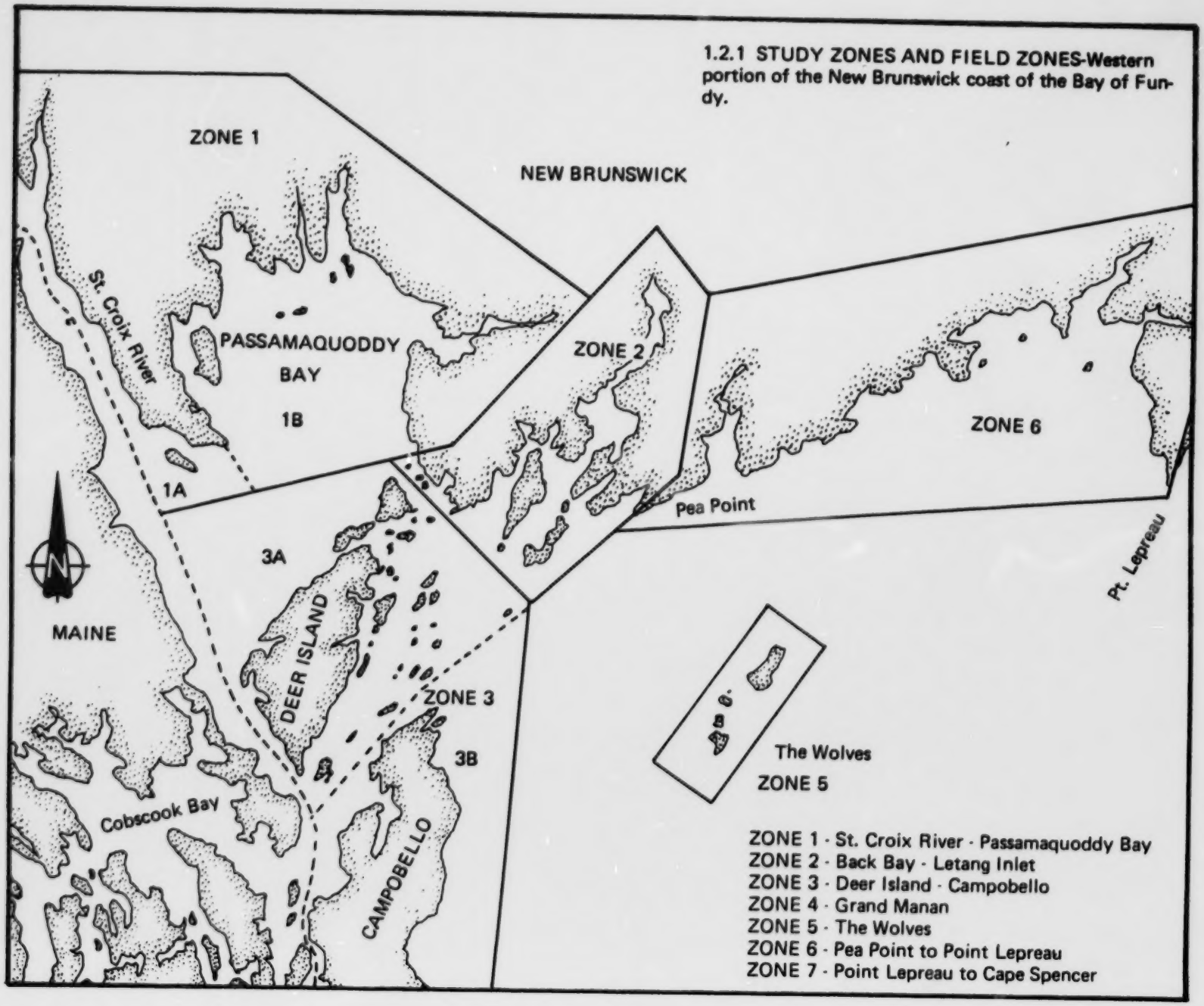
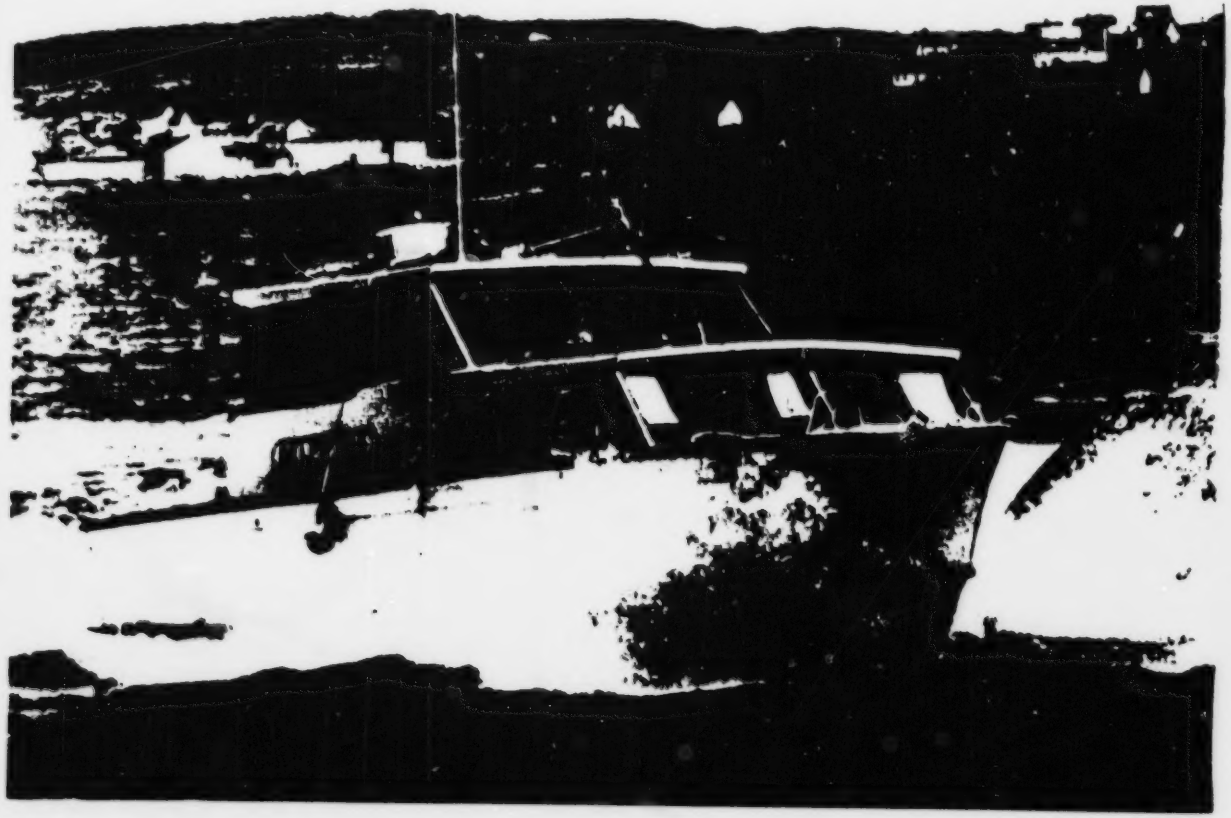

1.2.1a STUDY ZONES AND FIELD ZONES-New Brunswick coast of the Bay of Fundy.
MAINE
St. Croix River
ZONE 1
A
B
Passamaquoddy Bay
ZONE 2
NEW BRUNSWICK
ZONE 3
B
Pt. Lepreau
Musquash
Saint John
Cape Spencer
A
B
ZONE 7
Machias Seal Is.
ZONE 4
Grand Manan I.
ZONE 5
ZONE 6
A
B
C
D
ZONE 8
ZONE 9
A
B
Cape Enrage
BAY OF FUNDY
Brier I
St. Mary's Bay
Cape St. Mary's
Cape Fourchu
NOVA SCOTIA
Cape D'Or
Cape Sharp
Wolfville
FIELD ZONE BOUNDARY
STUDY ZONE BOUNDARY
0 6 12 18 24
SCALE (Miles)



1.2.1 STUDY ZONES AND FIELD ZONES-Western portion of the New Brunswick coast of the Bay of Fundy.



2.1.1 THE DELPHINUS, MRA'S SURVEY VESSEL

1. INTRODUCTION and OBJECTIVES

1.1. INTRODUCTION

Advances in technology during this century, coupled with world population increases and changes in socio-economic patterns, have had a profound impact on our traditional way of life. Heavy industry has developed to an unprecedented level and has spread from the original centres of development to new areas; including coastal sites which have historically drawn their sustenance from resource-based industries such as fishing. As a result, resource-based industries are increasingly in conflict with heavy industry since they can be, and have been, eliminated by heavy pollution. In addition, technological advances in fishing methods and resultant overharvesting have resulted in greatly reduced stocks of many fish species. At the same time, and largely as a result of these developments, man is currently looking at new ways to grow and harvest marine food species by controlled methods in the ancient, but new, science of aquaculture. Also, applied science is looking to previously unutilized food, drugs, additives and so on.

Unfortunately, while we have advanced technologically at a tremendous rate, we have, with the possible exception of traditionally valuable food species, accumulated very little useful information on our marine resources. There are many reasons for this lack of basic knowledge. Early field studies were usually academic in nature and little regard was paid to population size and sustainable yields, particularly for non-commercial species. In addition, advances in technology also influenced the biological fields and it became unfashionable to be involved in basic field biology. With the popularization of "Ecology" and the general availability of the Self-Contained Underwater Breathing Apparatus (SCUBA) this has all changed and we are now in a position to collect basic field data on most marine organisms. It is vital that we do so as rapidly as possible in order for us to make intelligent decisions regarding:

1. the location and extent of industrial development which should be allowed along our coast in relation to existing or potential resource-based industries;
2. the suitability of potentially marketable species for fisheries utilization;
3. the suitability of presently non-commercial species to potential utilization and the importance of these species to the maintenance of commercial species;
4. the monitoring of water quality with a view to preventing or stopping the introduction of harmful pollutants which may permanently damage our water systems or render our fisheries impotent;
5. the physical suitability of certain areas and species to the development of intensive fish farming and aquaculture; and
6. the maintenance of an environment which is suitable for high quality human existence.

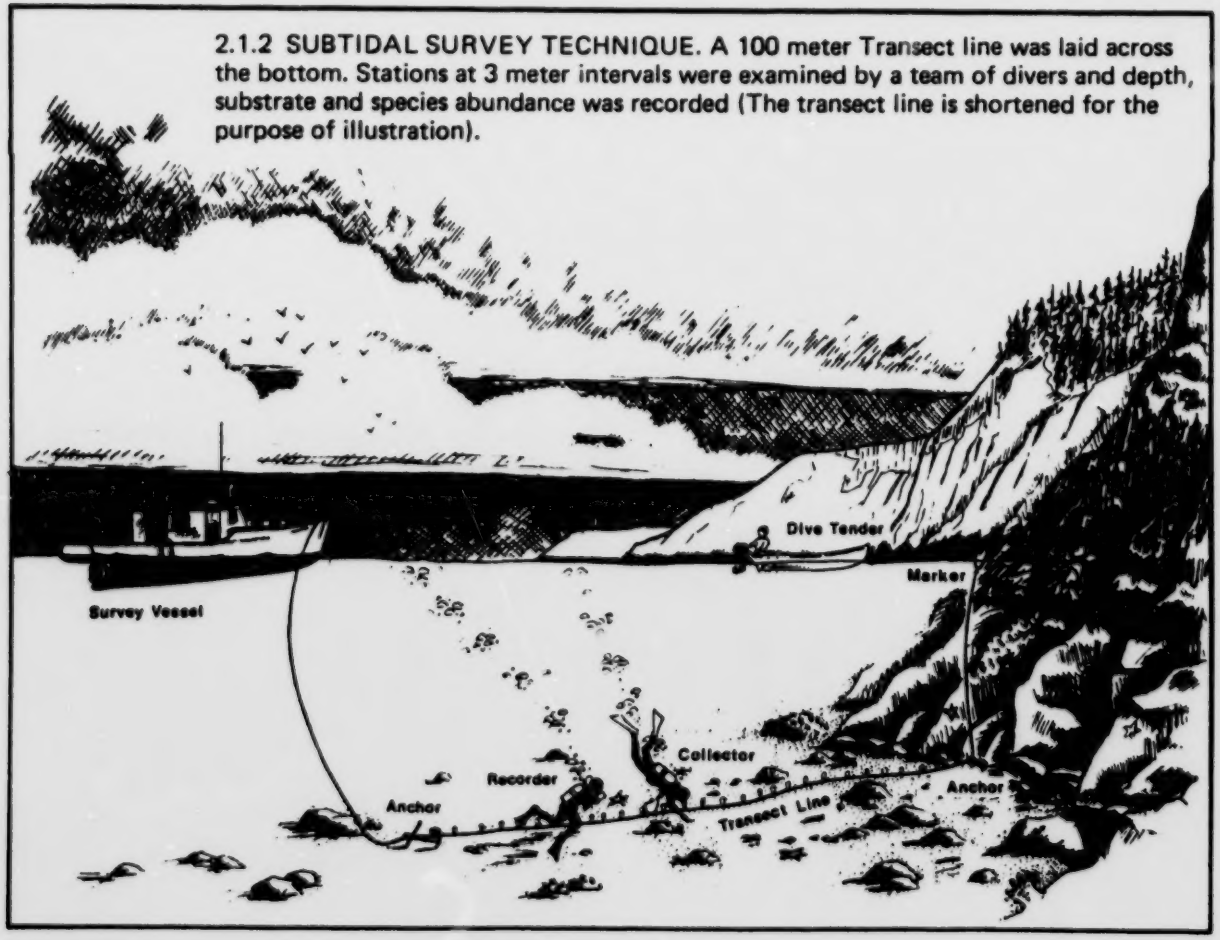
The Research and Development Branch, New Brunswick Department of Fisheries has recognized these needs and has contracted Marine Research Associates Ltd., Lord's Cove, Deer Island, N.B. to undertake a survey of the marine resources of the New Brunswick coast of the Bay of Fundy. This is one of a series of volumes giving our findings. It is hoped that this survey will eventually include the entire coast and will cover intertidal, shallow-water, deepwater, and pelagic organisms and that the information obtained will serve as the foundation for intelligent management and utilization of the marine resources of the Bay of Fundy.

1.2. OBJECTIVES

The purpose of this study was to catalogue, as fully as possible, the shallow-water marine resources of the Bay of Fundy coast. The coast was divided into zones, each encompassing a specific geographical area of a size where field work could be completed during a reasonable period of time. Zone locations and extents are shown in Figure 1.2.1.

Specifically, the objectives of this study were:

1. to compile qualitative and quantitative data on the composition and distribution of all marine species encountered in each zone as well as meteorological, geological, oceanographic and topographic data,
2. to collect data on salinity, temperature, conductivity and pH throughout the study area,
3. to collect information on the commercial fisheries of each zone including species fished and the fishing gear, grounds, landed weight and value of each species,
4. to collect information on the abundance and exploitation rates of exploited marine resources, other than those utilized by the commercial fishery, and
5. to collect information on all sources and types of pollution, the approximate discharge rate from each source, and the distribution and impact of each pollutant.



2.1.2 SUBTIDAL SURVEY TECHNIQUE. A 100 meter Transect line was laid across the bottom. Stations at 3 meter intervals were examined by a team of divers and depth, substrate and species abundance was recorded (The transect line is shortened for the purpose of illustration).

2. METHODS

Site data have been compiled by Marine Research Associates Ltd. over a continuous field period, both winter and summer, beginning in 1964. Numerous collecting methods have been used including: shore collection and observation, dip nets, plankton tows, minnow seines, bottom drags, and diving. Some sites have been visited hundreds of times by our field staff and have been subjected to close observation. Others have been visited specifically for examination in terms of this study.

Location of sites for shore examination, spot dives or transects was considered to be critical. Since the number of study sites were limited by time and cost, it was essential that these sites be representative of the zone and provide reasonable coverage. Choice of transect sites, for detailed quantitative data, were not made until spot dives and shore examinations were completed. As a result, it was possible to choose sites for detailed examination on the basis of known information and to obtain quantitative data which was more representative of the zone than would be true with randomly selected sites.

In general, spot dives and shore examinations were made at regular intervals along the coast. In many cases, sites were examined qualitatively. However, where specific organisms were of interest, or where the site was particularly interesting, intertidal and subtidal transects were run as outlined below and water quality data have been collected as detailed elsewhere in this volume.

Data on shore sites and some dive sites were collected by teams traveling to the site by automobile. Information was collected by careful examination of the organisms occurring in the selected area and, where necessary, dip nets or minnow seines were used to sample tide pools or shallow water areas.

Until 1977, most field data were collected by teams of divers working from an outboard powered skiff or the survey vessel "Donna G". The "Delphinus" (Figure 2.1.1) was acquired in 1977 and data for the 1977-78 season were collected from this vessel.

All divers were equipped with 3/8 inch "wet" suits and accessories or constant volume dry suits (UNISUITS). The Unisuits proved to be invaluable during winter operations and allowed our divers to operate in extremely cold waters with much the same comfort as in summer. Single 72 cu. ft. air cylinders with single hose Poseidon regulators were used on all dives. Recordings of depth were taken from Aqua-Lung underwater depth gauges checked against measured depths. Underwater observations were recorded in pencil on Appleton Underwater "Ascot" paper.

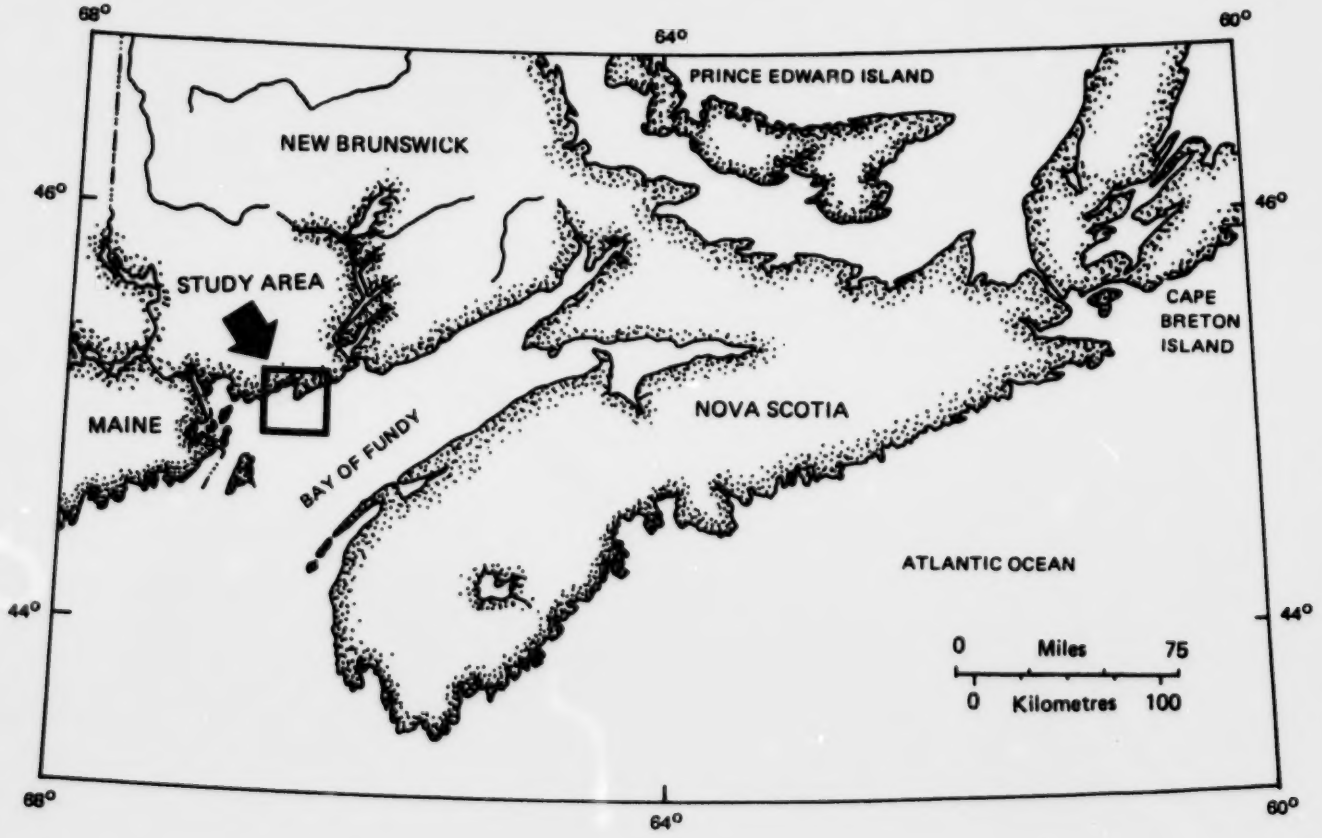
Spot dives were conducted by moving into shallow water at a predetermined site. Divers entered the water and roamed widely over the bottom at various depths recording the substrate, abundance of resident organisms, water temperature, and depth relationships encountered. Where quantitative data were required, a meter square was placed at random on the bottom and the numbers of animals within this square were counted. Upon completion of the dive, the diver was debriefed using a special Site Data Form.

"Sweep" dives were used where it was necessary to cover wide areas in shallow water. In such cases, a diver was towed on a line about 30 feet behind an outboard-powered dinghy. When areas of interest were encountered the diver released the line and examined the bottom. Data were recorded as outlined above.

Transects were run where detailed information on a site was required as shown in Figure 2.1.2. The dive team consisted of two divers, a dive-tender, and boat operator-debriefer. The divers were responsible for examination of the transect area, recording of data, and the collection of specimens. The dive-tender was responsible for deploying and picking up the diving team and insuring their safety on the surface. The boat operator-debriefer was responsible for maintaining the support vessel, recording the dive site data, and debriefing the divers at the conclusion of each dive to insure that the maximum amount of information was obtained. On steep cliffs running into deep water, one end of the transect line was anchored at the base of the cliff or, if possible, at the low water mark and laid across the bottom at right angles to the shore and anchored to the outer end. When currents permitted, the survey vessel was anchored to the other end of the transect line. When this was not possible, both ends of the transect line were marked with a buoy. In swift current, a safety line with life jackets attached was allowed to trail several hundred feet downstream from the outer buoy.

Two divers entered the water at the anchor line or outer marker buoy and proceeded to dive to the other end of the transect line. Until 1976, numbered markers at 10 foot intervals on the transect line indicated each of thirty stations on the line. From 1977 onwards a 100 meter transect line was used with stations at 3 meter intervals. At each station, the diver-recorder recorded the depth, substrate, and organisms. Where quantitative data were required a meter square was placed at the stations and counts were made within the square. Any distinct change in substrate or faunal composition which occurred between stations was also recorded. This activity was carried out along the length of the transect line to the high water mark where possible. Where this was not possible due to the steepness of a cliff, observations were made from low water. When data were required beyond the outer limit of the transect line, spot dives were made at various depths to a maximum of 100 feet. In these cases a "Shot" line was used with a stand-by diver acting as safety man.

Where visibility was at or near zero, all observations and records were made using underwater lights.



3.1.1. THE STUDY AREA

3. THE STUDY AREA

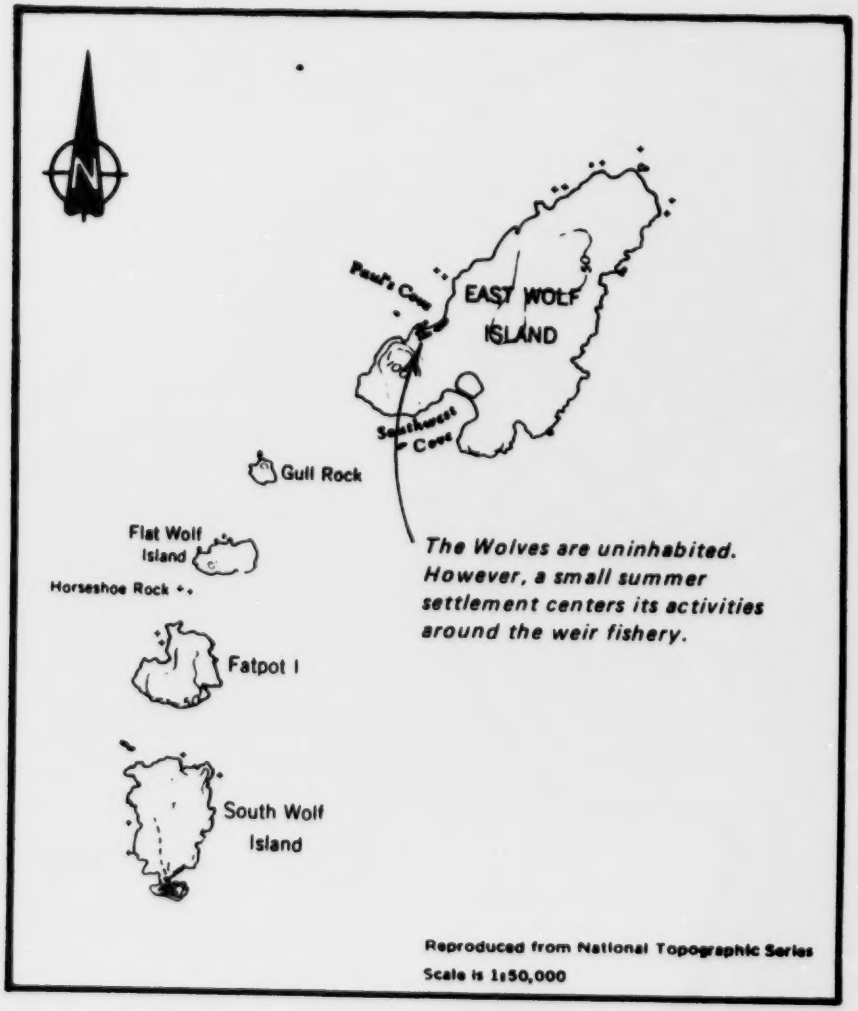
3.1 THE STUDY AREA - THE WOLVES

The study area for Zone 5, The Wolves Islands, was considered to include all tidal waters within the confines of the 100 foot contour.

3.2 STUDY SITES

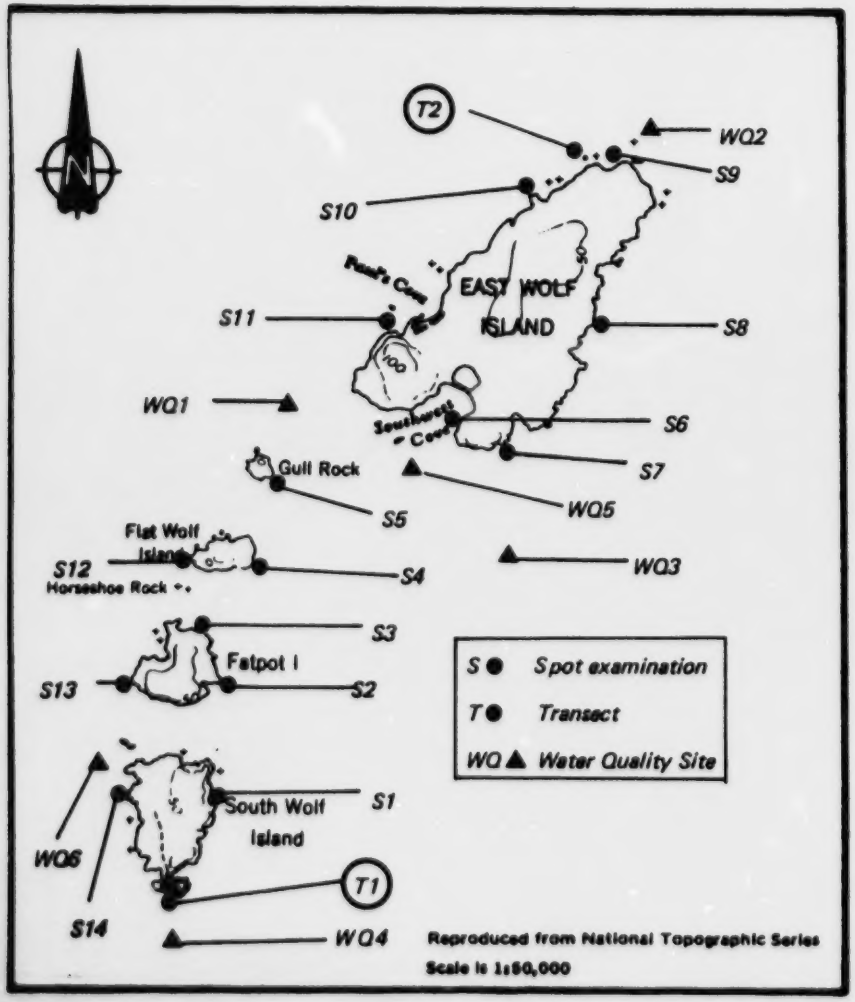
In all, 14 intertidal and subtidal spot examinations, 2 transects and 6 water quality sites were examined as shown in Figure 3.2.1. Where available, additional data were incorporated with new field data during the preparation of the manuscript. Original site data are on file at Marine Research Associates Ltd. offices at Deer Island, N.B.

3.1.2
PRINCIPAL FEATURES **THE WOLVES ISLANDS**


N
EAST WOLF ISLAND
Gull Rock
Flat Wolf Island
Horseshoe Rock
Fatpot I
South Wolf Island
The Wolves are uninhabited. However, a small summer settlement centers its activities around the weir fishery.
Reproduced from National Topographic Series
Scale is 1:50,000

3.2.1
STUDY SITES

THE WOLVES ISLANDS



4. PHYSICAL DESCRIPTION

4.1 INTRODUCTION. This section is devoted to a general description of the physical aspects of the study area, particularly as they relate to the marine resources.

Politically, the Wolves are part of Charlotte County, Province of New Brunswick

4.2 TOPOGRAPHY. As shown in Figure 4.2.1 the Wolves are relatively low lying with a maximum elevation of about 100 feet on East Wolf Island. Five islands form the group: East Wolf Island, Gull Rock, Flat Wolf Island, Fatpot Island and South Wolf Island.

4.3 GEOLOGY. The Wolves are composed of reddish Precambrian granite. "In places on the Wolves the granite contains inclusions of greenstone, some of which are partly granitized, and the complex is cut by red, granitic dykes". (Alcock, 1946)

Our experience indicates that subtidal geology conforms to terrestrial geology.

4.4 CLIMATE AND METEOROLOGY. No long-term data are available for the Wolves. However, its offshore location is close to Grand Manan and data from this island would be applicable to the Wolves. As with all study zones in the Bay of Fundy, the area is in the north temperate region with strong marine influences. Summer temperatures are characteristically cooler than on the adjacent mainland and winters are warmer with more rain.

a) Temperature. Temperature data for Grand Manan are given in Table 4.4.1 and Figure 4.4.1. These data can be considered as applicable to the Wolves.

b) Precipitation. Average monthly values for rainfall (from 30 years data) are given in Table 4.4.1 and Figure 4.4.2 for rainfall and Figure 4.4.3 for snowfall for Grand Manan Island. These data can be considered as applicable to the Wolves.

c) Fog. The Wolves are subjected to long periods of summer fog created when warm continental air meets the cold waters of the Bay of Fundy. The pattern is similar to Grand Manan Island as shown in Figure 4.4.4.

4.5 FRESHWATER RESOURCES. The Wolves have no rivers, streams or lakes. A single pond is located at Southwest Cove on East Wolf Island.

4.6 TERRESTRIAL VEGETATION. While no special effort was made to survey the vegetation of the islands, the three largest islands are wooded, principally with conifers. Trees have been killed in several areas where gulls nest.

4.2.1
TOPOGRAPHY

THE WOLVES ISLANDS

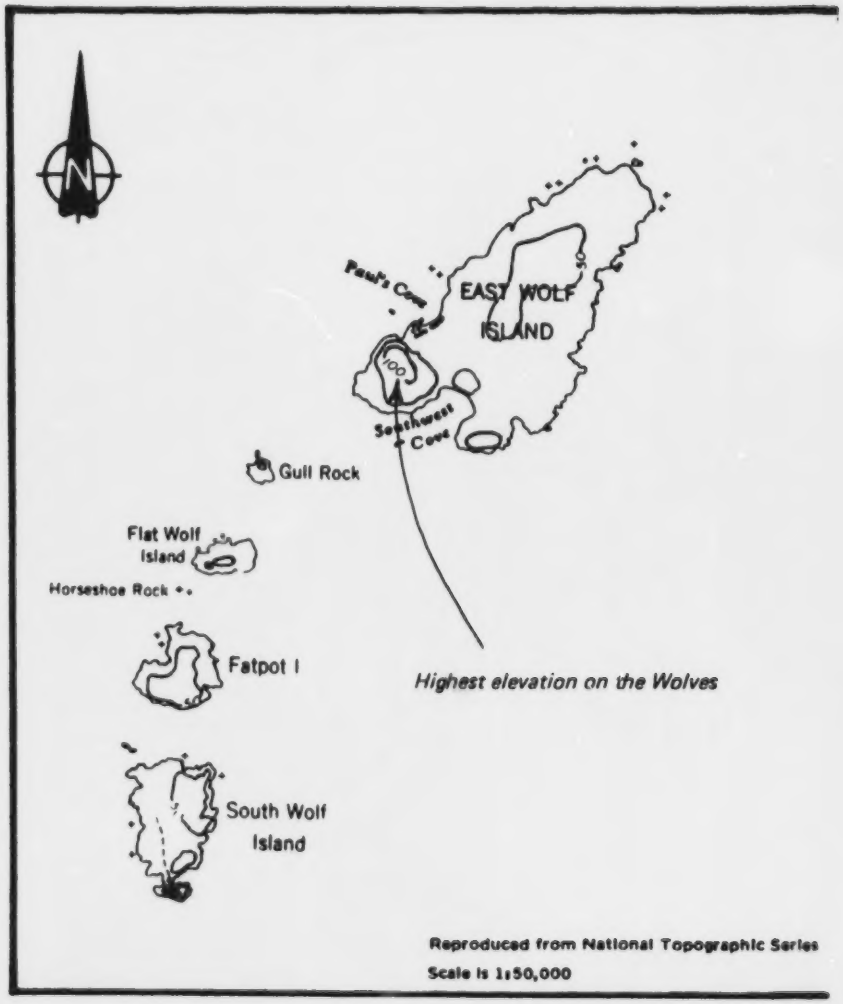
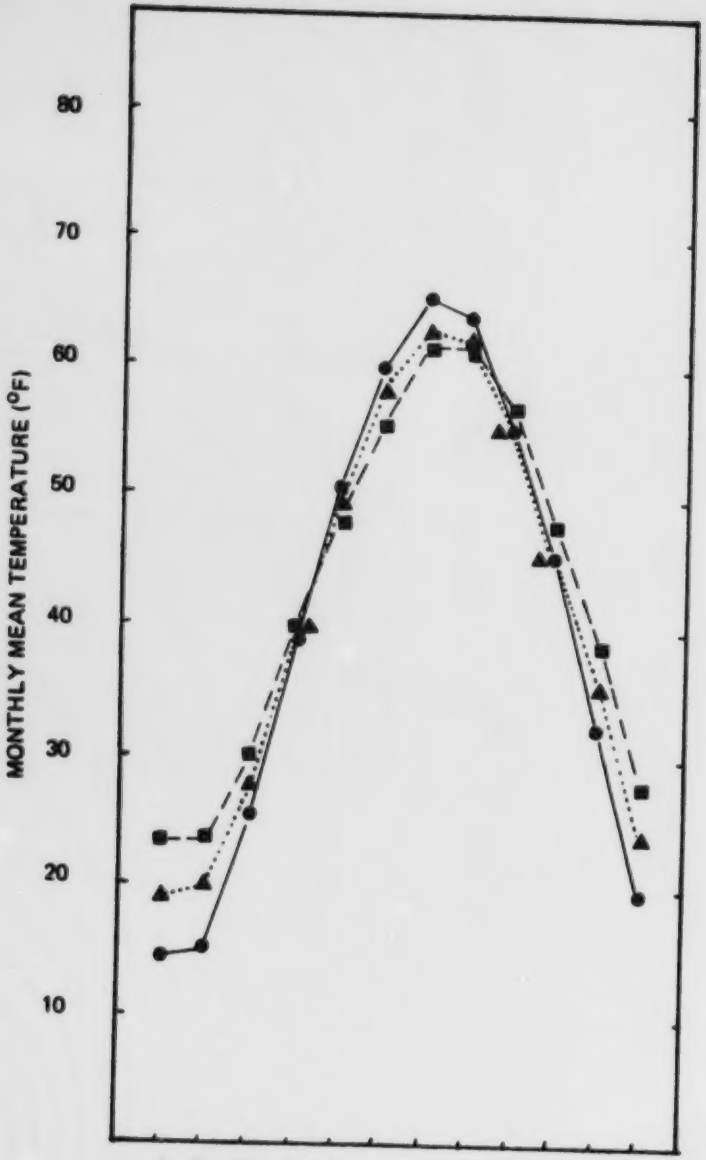
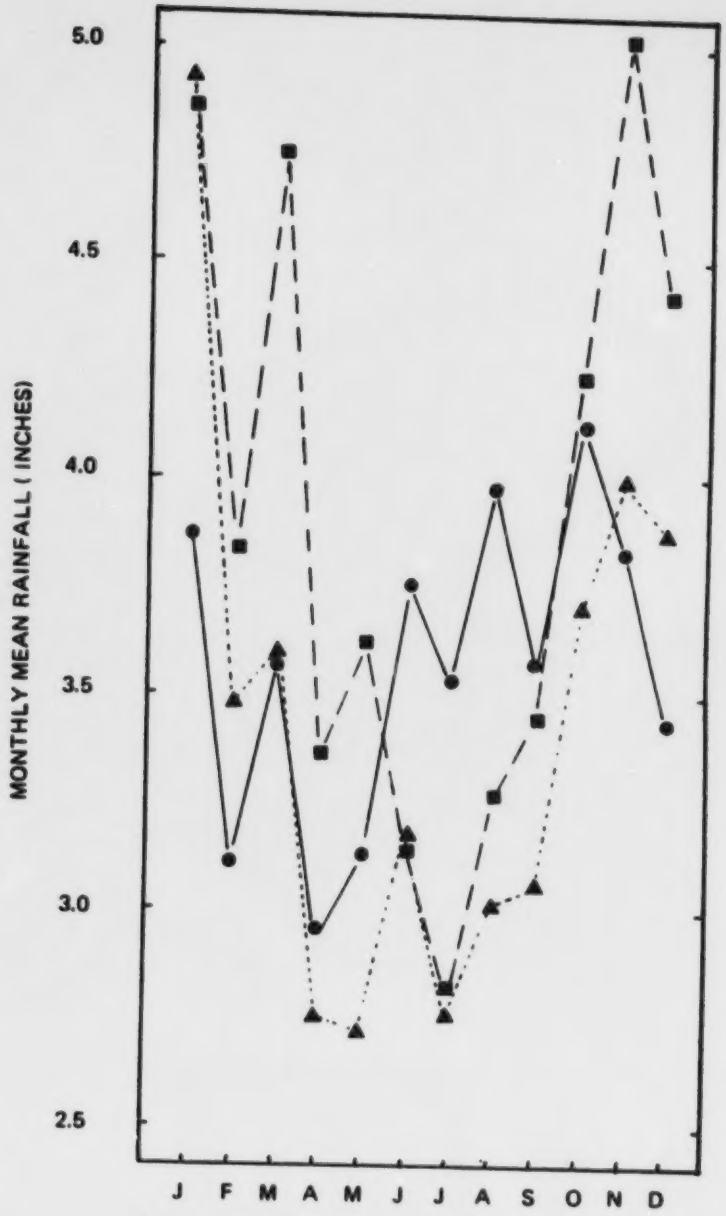


TABLE 4.4.1. CLIMATOLOGICAL DATA FROM GRAND MANAN averaged from 30 years data. (Data from Climatic Summaries for selected meteorological stations in the Dominion of Canada Vol. 1). Temperature in degrees F, Rainfall and Snowfall in inches, T-Trace amounts).

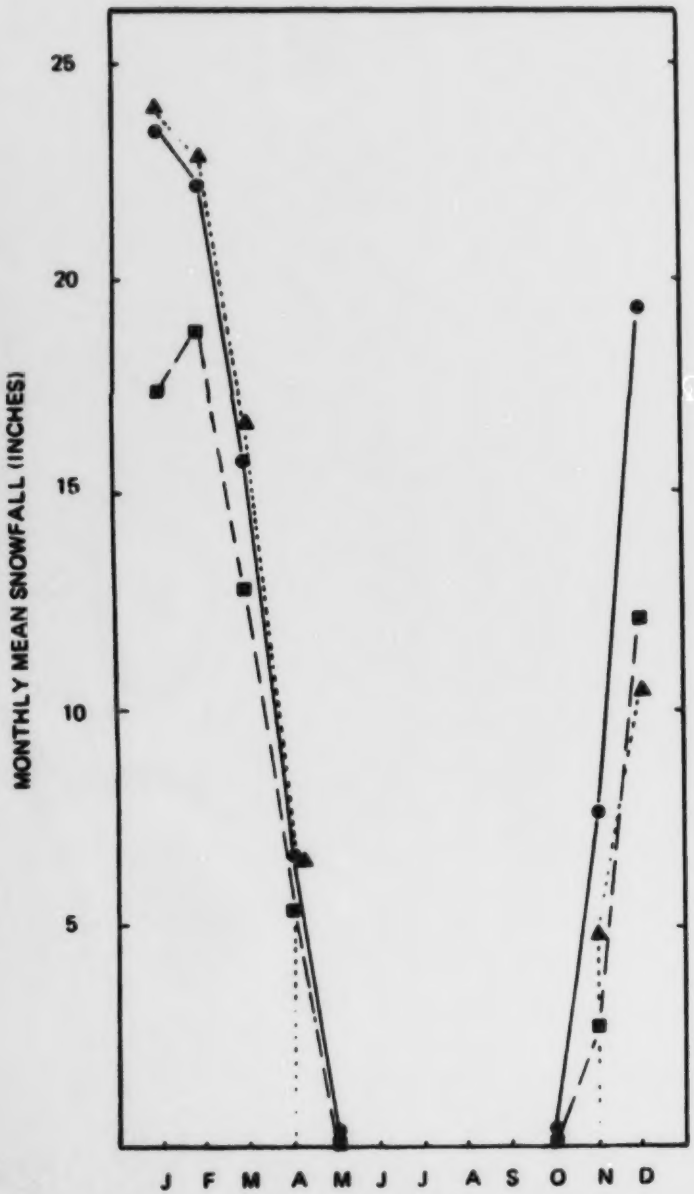
MONTH	AV . DAILY MAX. TEMP.	AV. DAILY MIN. TEMP.	AV. DAILY MEAN TEMP.	AV. RAINFALL	AV. SNOWFALL
	GM	GM	GM	GM	GM
Jan.	32	15	24	4.86	17.2
Feb.	21	16	23	3.83	18.9
Mar.	37	24	30	4.76	12.7
Apr.	46	33	40	3.37	5.5
May	56	41	48	3.61	T
Jun.	64	48	56	3.13	.
July	70	54	62	2.80	.
Aug.	69	54	62	3.29	.
Sept.	64	50	57	3.45	
Oct.	54	42	48	4.21	0.3
Nov.	45	33	39	5.01	2.8
Dec.	36	20	28	4.43	12.1
Year	50	36	43	46.75	69.5



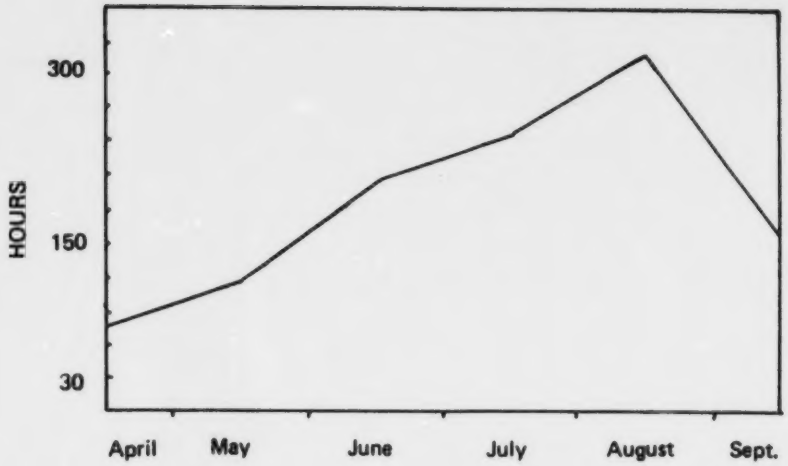
4.4.1 LONG-TERM MONTHLY MEAN TEMPERATURES FOR FREDERICTON (●), ST. ANDREWS (▲) AND GRAND MANAN (■).



4.4.2 LONG TERM MONTHLY RAINFALL FOR FREDERICTON (●), ST. ANDREWS (▲) AND GRAND MANAN (■).



4.4.3 LONG TERM MONTHLY MEAN SNOW FALL FOR FREDERICTON (●), ST. ANDREWS (▲) AND GRAND MANAN (■)



4.4.4 HOURS OF FOG ALARM AT GANNET ROCK, GRAND MANAN

5. OCEANOGRAPHY

5.1 INTRODUCTION. The Wolves, because of their off-shore location, are subjected to the full force of the elements. In addition, the islands are well removed from the influence of major rivers. Consequently, these islands share biological affinities with off-shore islands such as Grand Manan.

5.2 BATHYMETRY. Figure 5.2.1 shows the bathymetry of the study area. As can be seen, depths of 100 to 200 feet and more occur in close proximity to the islands. As a result, pelagic fish, birds and mamals occur commonly in the area.

5.3 SUBSTRATES. (Figure 5.3.1) Because of the exposed position of these islands, suspended sediment loads are light and, as a result, mud bottom was not commonly encountered. The shallow-water areas are dominated by rocky substrates in the form of ledge, boulder, cobble and gravel. Sand forms the second most common substrate.

5.4 TIDES. The Wolves are influenced by the large tidal fluctuations of the Bay. At Saint John Harbour, approximately 30 miles away, "the tide has an average range of 6.4 metres (21 feet) with maximum ranges of nearly 8.8 metres (29 ft.) during spring tides and 4.6 metres (15.2 ft.) during neap tides...The tides are of the very regular semi-diurnal type, with any two consecutive tides having nearly the same magnitude and pattern". (Neu, 1973)

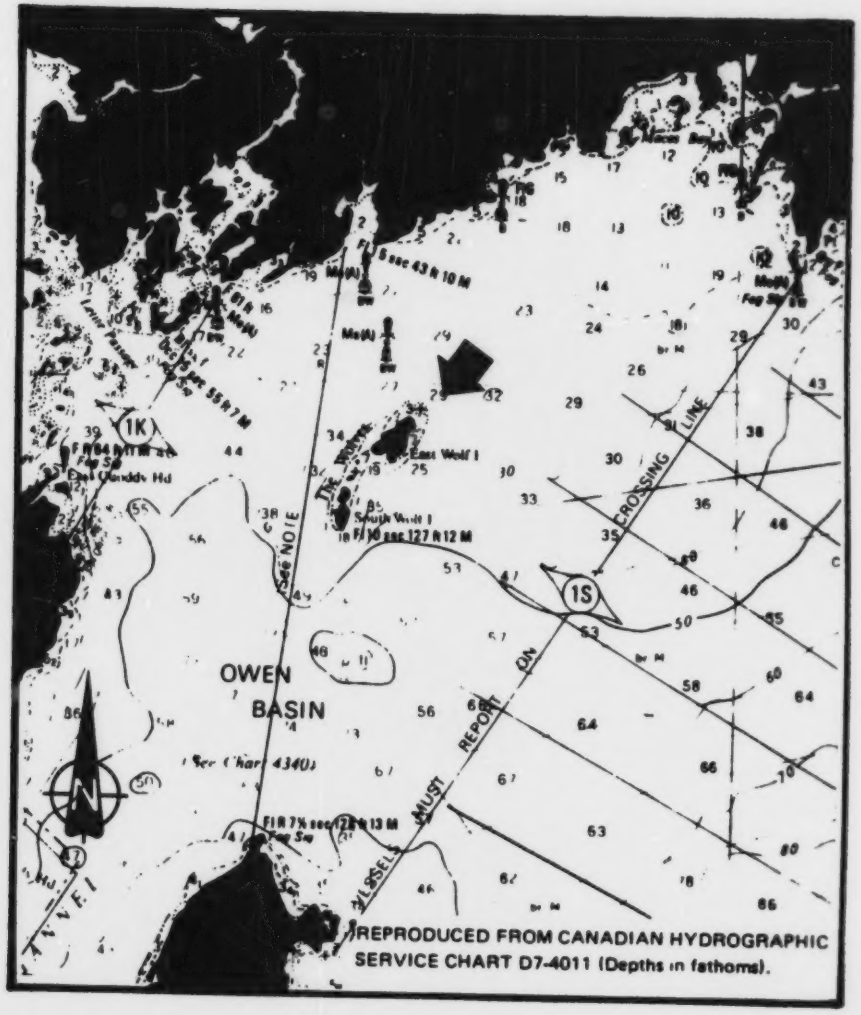
5.5 CURRENTS. Seasonal current patterns as determined by drift bottle studies and field observations by MRA staff are shown in Figures 5.5.1 to 5.5.4. While currents can be moderately strong, they did not reach the high velocities encountered at Grand Manan and West Isles. No rips were encountered.

5.6 LIGHT AND WATER CLARITY. Waters in the study area are characterized by low loads of suspended matter. This was reflected in diver visibility ranging from 20 to 30 feet. Winter visibility is known to exceed 40 feet (R. Richardson, per. comm). Prolific growths of algae to 50 feet or more further indicate good light penetration.

5.7 TEMPERATURES. Since the area is not influenced by freshwater runoff, temperatures are not considered to be subject to wide seasonal fluctuations. No major winter ice forms in the area. Temperature records from this survey are given in Table 5.7.1.

5.8 SALINITY. Salinity records are given in Table 5.7.1. As can be seen, values are near 30‰ throughout the water column and influence of freshwater from major rivers is obviously minimal. Fresh surface waters from the Saint John River lay well to the west of the Wolves as shown in Figure 5.8.1.

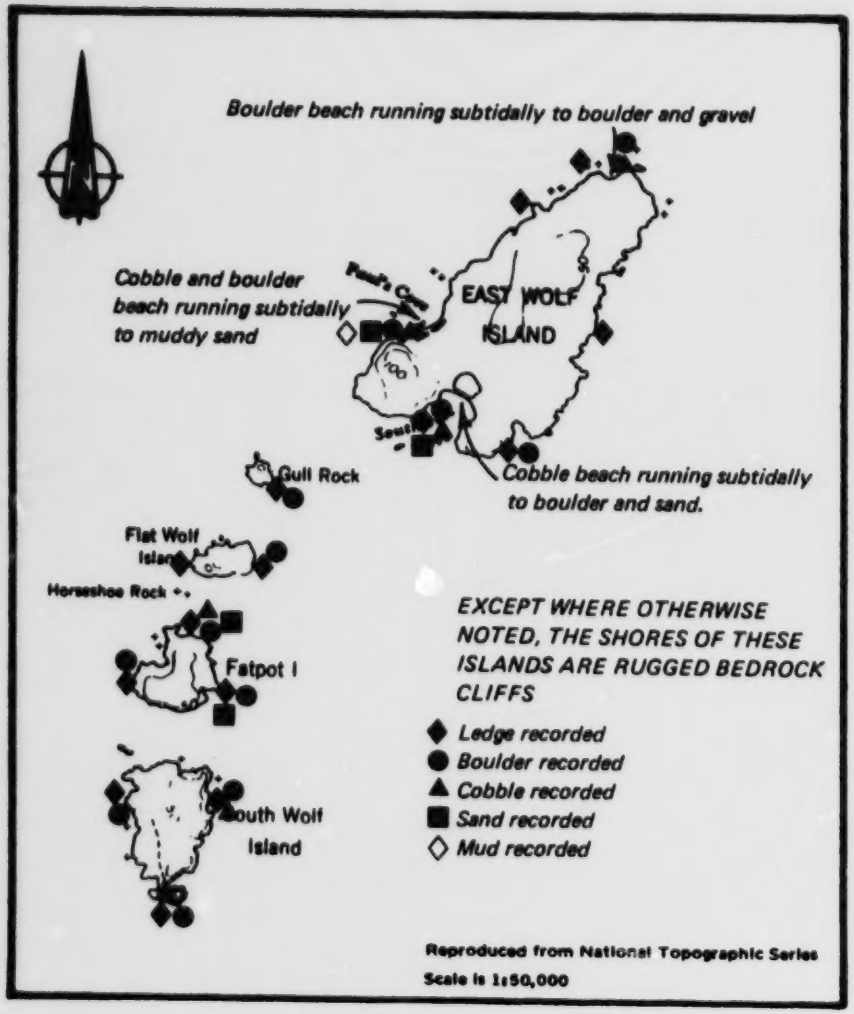
5.2.1
BATHYMETRY **THE WOLVES ISLANDS**



5.9 WAVES AND EROSION. The Wolves are openly exposed to the full force of storms from all directions. Erosion of the hard granitic rock is characteristic as indicated by the common shore profile. Typically, shores consist of rugged cliffs dropping, subtidally to large boulders derived through erosion of the cliff face.

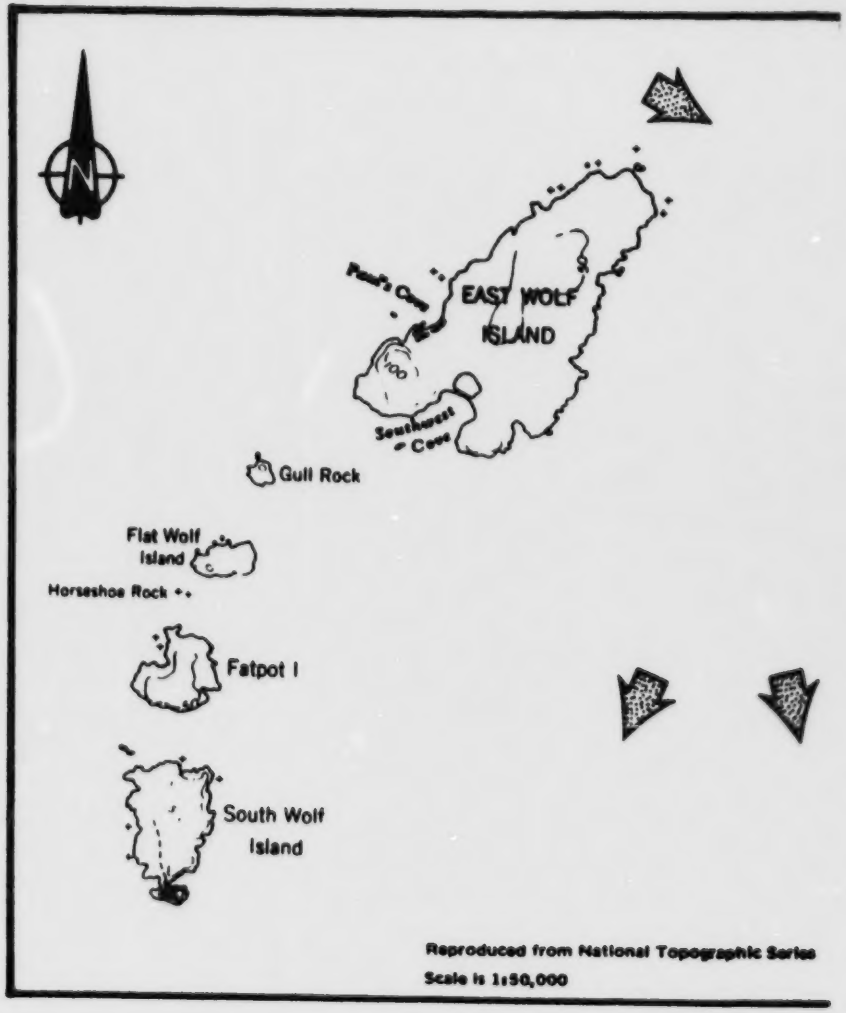
5.3.1
SUBSTRATES

THE WOLVES ISLANDS


Boulder beach running subtidally to boulder and gravel
Cobble and boulder beach running subtidally to muddy sand
EAST WOLF ISLAND
Gull Rock
Cobble beach running subtidally to boulder and sand.
Flat Wolf Island
Horseshoe Rock
Fatpot I
South Wolf Island
EXCEPT WHERE OTHERWISE NOTED, THE SHORES OF THESE ISLANDS ARE RUGGED BEDROCK CLIFFS
Ledge recorded
Boulder recorded
Cobble recorded
Sand recorded
Mud recorded
Reproduced from National Topographic Series
Scale is 1:50,000

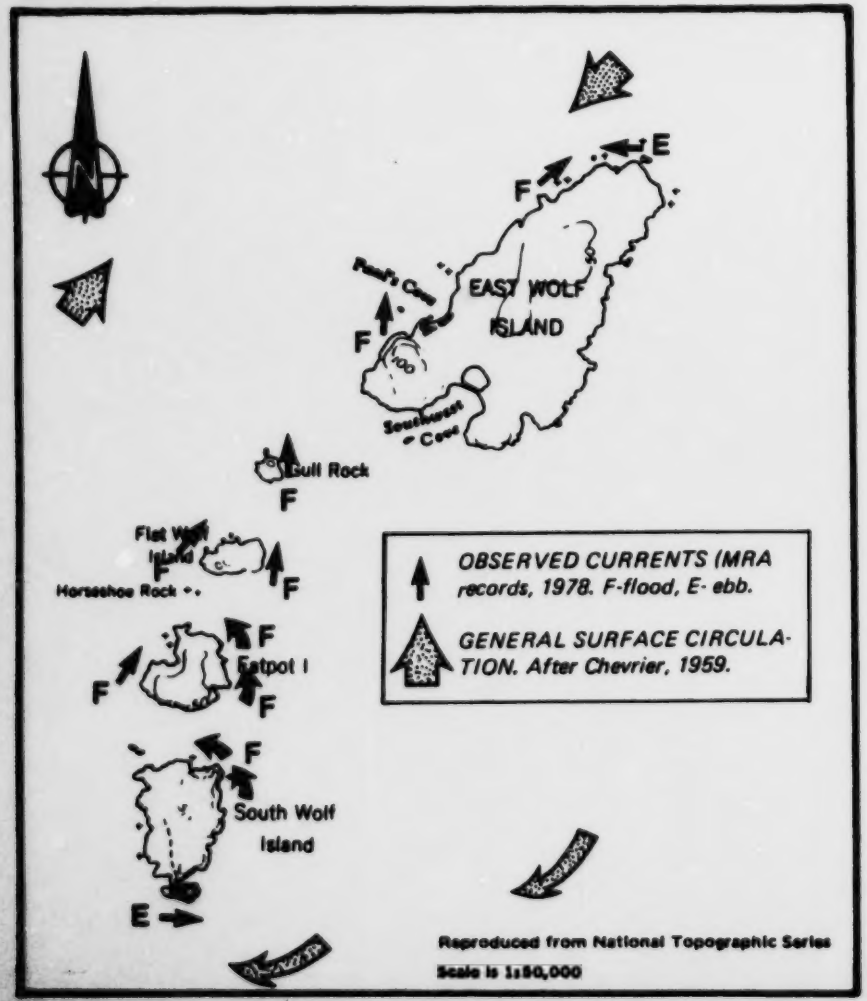
5.5.1
SURFACE CIRCULATION - SPRING (Chevrier, 1959)

THE WOLVES ISLANDS



5.5.2
SURFACE CIRCULATION - SUMMER (Chevrier, 1959 and MRA)

THE WOLVES ISLANDS

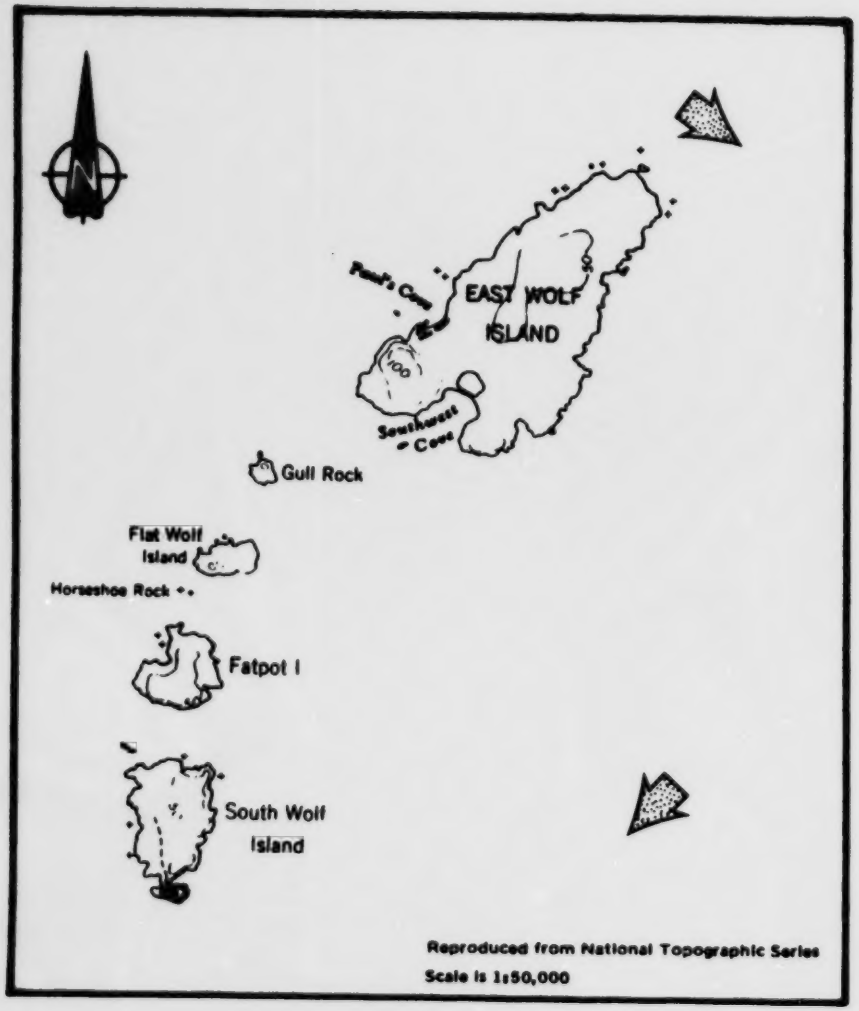


5.5.3
SURFACE CIRCULATION - FALL (Chevrier 1959)

THE WOLVES ISLANDS

5.5.4
SURFACE CIRCULATION - WINTER (Chevrier, 1959)

THE WOLVES ISLANDS



5.8.1
SALINITY DURING SPRING FRESHET (After Hachey & Bailey, 1952)

THE WOLVES ISLANDS

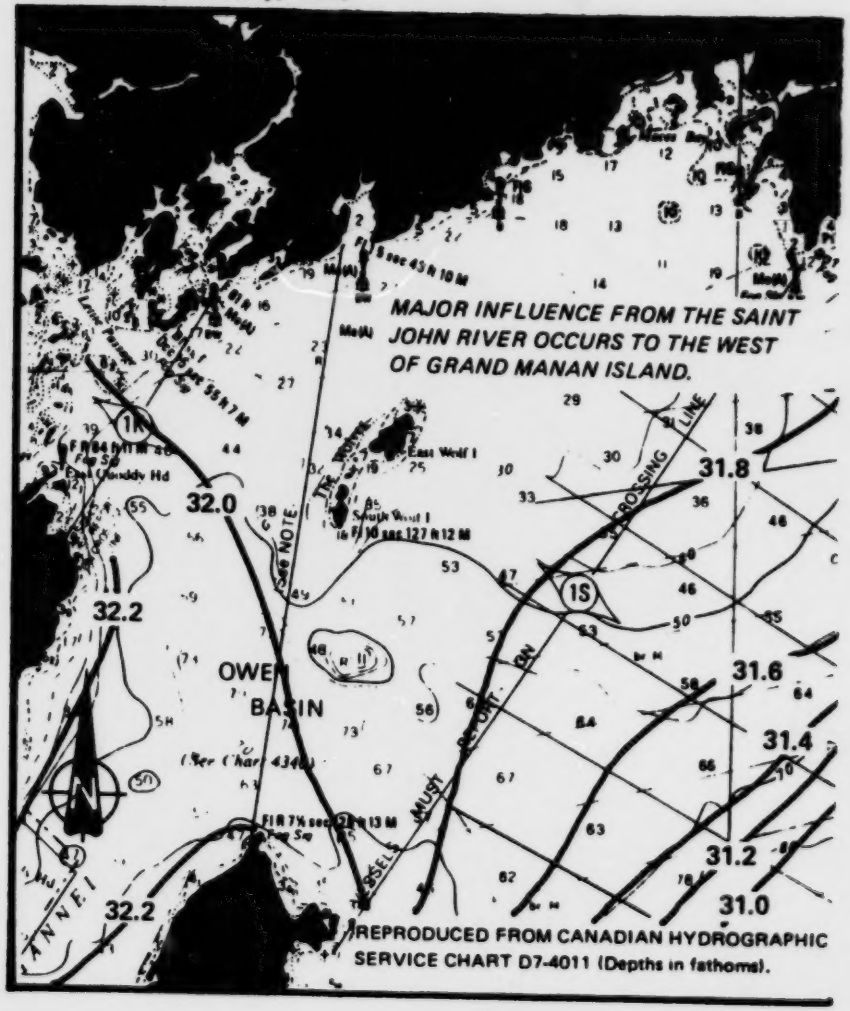


TABLE 5.7.1 TEMPERATURE (^{0}C, SALINITY (‰) AND pH (at 14^0) RECORDS FROM THE WOLVES ISLANDS, JULY, 1978

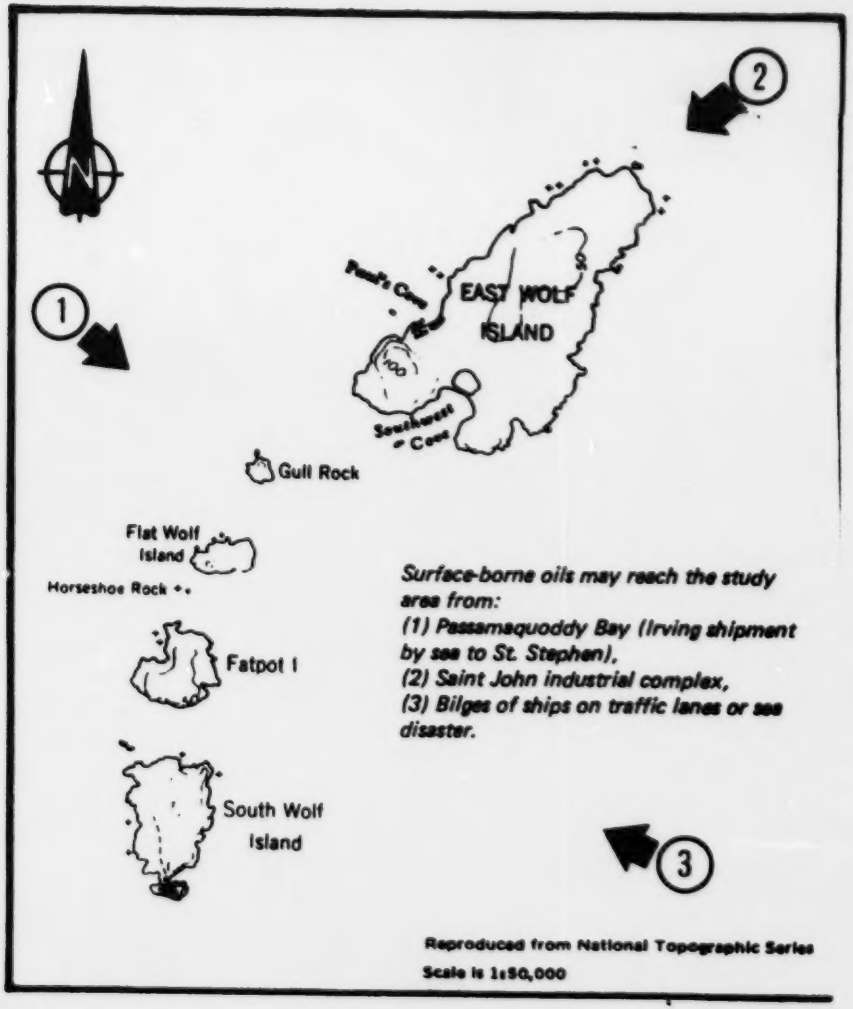
STATION		7.1			7.2			7.3						7.5			7.6		
DATE		JULY			JULY			JULY			JULY			JULY			JULY		
DEPTH		13	27	31	13	27	31	13	27	31	13	27	31	13	27	31	13	27	31
0	^{0}C	7.6		11.2	8.6		9.9	8.3		10.4	9.1		11.3	8.8			8.6		
	‰	29.8		30.0	29.7		29.9	29.7		29.9	29.6		30.0	29.7			29.7		
	pH		7.40			7.61			7.59			7.61							
1.5M	^{0}C	7.7		10.3	8.6		9.8	8.2		10.3	8.9		9.4	8.8			8.2		
	^{0}/$_{00}$	30.0		30.0	29.7		30.0	29.7		30.0	29.7		30.2	29.7			29.8		
3.0M	^{0}C	7.7		9.8	8.6		9.6	8.0		10.3	8.7		9.4	8.7			8.2		
	^{0}/$_{00}$	30.0		30.0	29.7		30.0	29.8		29.9	29.7		30.1	29.6			29.8		
6.0M	^{0}C	7.6		9.4	8.2		9.5	8.1		10.0	8.7		9.3	8.4			8.2		
	^{0}/$_{00}$	29.9		30.1	29.7		30.0	29.7		30.0	29.6		30.1	29.7			29.8		
9.0	^{0}C	7.6		9.1	8.4		9.4	8.1		9.5	8.6		8.9	8.5			8.2		
	^{0}/$_{00}$	29.9		30.2	29.7		30.1	29.8		30.2	29.7		30.2	29.7			29.8		
12.0M	^{0}C	7.6		9.1	8.2		9.3	8.0		9.4	8.6		8.7	7.5			8.2		
	^{0}/$_{00}$	29.9		30.2	29.8		30.1	29.9		30.3	29.7		30.1	29.9			29.7		

6. WATER QUALITY AND POLLUTION

6.1 There are no fixed sources of pollution in the study area and water quality is considered to be high. Nevertheless, circulation patterns in the Bay of Fundy make the area susceptible to surface borne pollution originating anywhere in the Bay. Principal sources of pollution in this area will result from catastrophic losses of surface borne oils (primarily oil products) originating on the traffic lanes to Saint John or from Saint John's industrial complex (Figure 6.1.1) under suitable weather conditions.

6.6.1
POTENTIAL POLLUTION SOURCES

THE WOLVES ISLANDS



7. PLANTS & ANIMALS

7. PLANTS AND ANIMALS

The following section documents the plants and animals of the study area as recorded by MRA's field staff. While not all species occurring in the area were encountered during the field survey, a large percentage were located and their distribution and abundance patterns were recorded. To our knowledge, this is the first major documentation of the benthic fauna of the Wolves.

Although actual numbers of many species were recorded, abundance records presented here are qualitative. In general abundance was determined on the following basis:

PRESENT (P)	A species was considered to be "present", if it occurred only in small numbers and was usually difficult to locate.
COMMON (C)	A species was considered to be "common", if it was a common part of the flora and fauna and was easily observed and located.
ABUNDANT (A)	A species was considered to be "abundant" if it occurred in unusually large numbers and dominated the flora or fauna of a particular site.

Where Distribution and Abundance records are listed in the Annotated list of species, the transect or study site is given first followed by the abundance notation. For example, "1-A" indicates the species was abundant at site one. An abundance range (P-A) indicates that abundance varied from present to abundant depending on substrate or depth

PORIFERA
(SPONGES)

7.1 INTRODUCTION

Numerous species of sponges occur in the Bay of Fundy. A few occur intertidally but most are found subtidally from low water to depths of 100 feet and more; usually on hard substrates. At the Wolves, sponges were found to be a common component of the local fauna. While they were recorded throughout the study area, they appear to occur more generally and abundantly on the eastern side of the islands.

While potential exists for the pharmaceutical utilization of chemicals extracted from certain species, there is no present commercial utilization of this group

7.2 ANNOTATED LIST OF SPECIES

7.2.1 CRUMB-OF-BREAD SPONGE/*Halichondria panacea* (Pallas)

Description - Irregular encrusting masses to 6 inches; often with erect chimney-like structures; yellow, green, purple.

Habitat - Intertidal and subtidal on rocks, shells and pilings.

Distribution and abundance (Figure 7.2.1) - T1-P, T2-C, 2-P, 4-C, 6-P to C, 7-P, 8-P, 10-A.

7.2.2 DEADMAN'S FINGERS/*Haliclona (Chalina) oculata* (Linnaeus)

Description - A large (to 18 inches) upright branching sponge composed of many close-set, finger - like branches supported on a single stock; brown to soft orange-red.

Habitat - Grows abundantly subtidally on pilings and rock substrate.

Distribution and Abundance (Figure 7.2.2)- T1-P, T2-P to C, 1-P to C, 2-P, 6-P to C, 7-P, 8-P, 10-C, 12-C.

DEAD-MAN'S FINGERS

7.2.3 IOPHON SPONGE/*Iophon pettersoni*

Description - A highly textured encrusting sponge found on living brachiopods (*Terebratulina septentrionalis*); light tan.

Habitat - Occurs most commonly on brachiopods found on rock ledges, overhangs and on the bottoms of rock debris from low water to, at least, 100 feet.

Distribution and Abundance (Figure 7.2.1)-T1-P.

7.2.4 TUFTED SPONGE/ *Scypha (Grantia) ciliata* Fabricius

Description - Single, small (8 cm), vase-like sponge with osculum at the top; whitish-yellow.

Habitat - Moderately common subtidally on wharf pilings and floats. Also found subtidally on the undersurface of loose rocks.

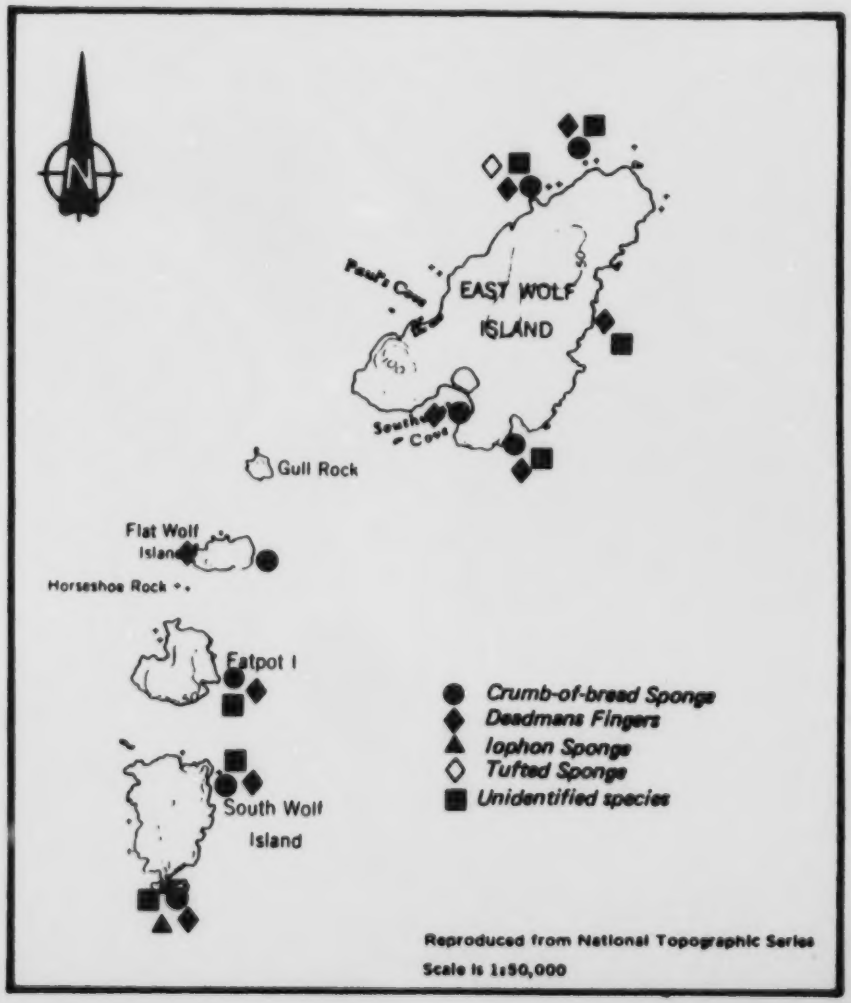
Distribution and Abundance (Figure 7.2.1)-10-P.

7.2.5 UNIDENTIFIED SPONGES

Unidentified species of sponges were recorded. Since it is difficult to identify many species on the basis of external morphology, these species were mapped together.

Tentative Identification, Distribution and Abundance (7.2.1)
Red encrusting species: T1-P to C, T2-C, 1-P, 7-P, 8-P
Myxilla-like species: T1-P, T2-C, 2-P, 3-A, 10-P
Phakellia-like species: T2-C

7.2.1
DISTRIBUTION OF SPONGES **THE WOLVES ISLANDS**



CNIDARIA
CTENOPHORA
(JELLYFISH, ANEMONES, ETC.)
(COMB JELLIES)

7.3 INTRODUCTION

Hydroids, jellyfish, sea anemones, soft corals and other Cnidarians form an important part of the fauna of the Bay of Fundy. Most species are either subtidal or free-floating. A few, principally certain anemones and hydroids, occur intertidally; mainly in tide pools. While most species are generally distributed at the Wolves, soft corals and anemones appear to occur most commonly on the eastern side of the islands. This distribution pattern was also observed for sponges.

There is no known commercial use for Cnidarians. Nevertheless, the Moon Jellyfish (*Aurelia aurita*) occasionally occurs in extremely large numbers during the summer. At such times, this species may cause structural damage to local herring weirs due to numerous Jellyfish restricting water flow through the netting. Resistance may cause tearing of the twine and, occasionally, collapse of supporting pilings.

7.4 ANNOTATED LIST OF SPECIES

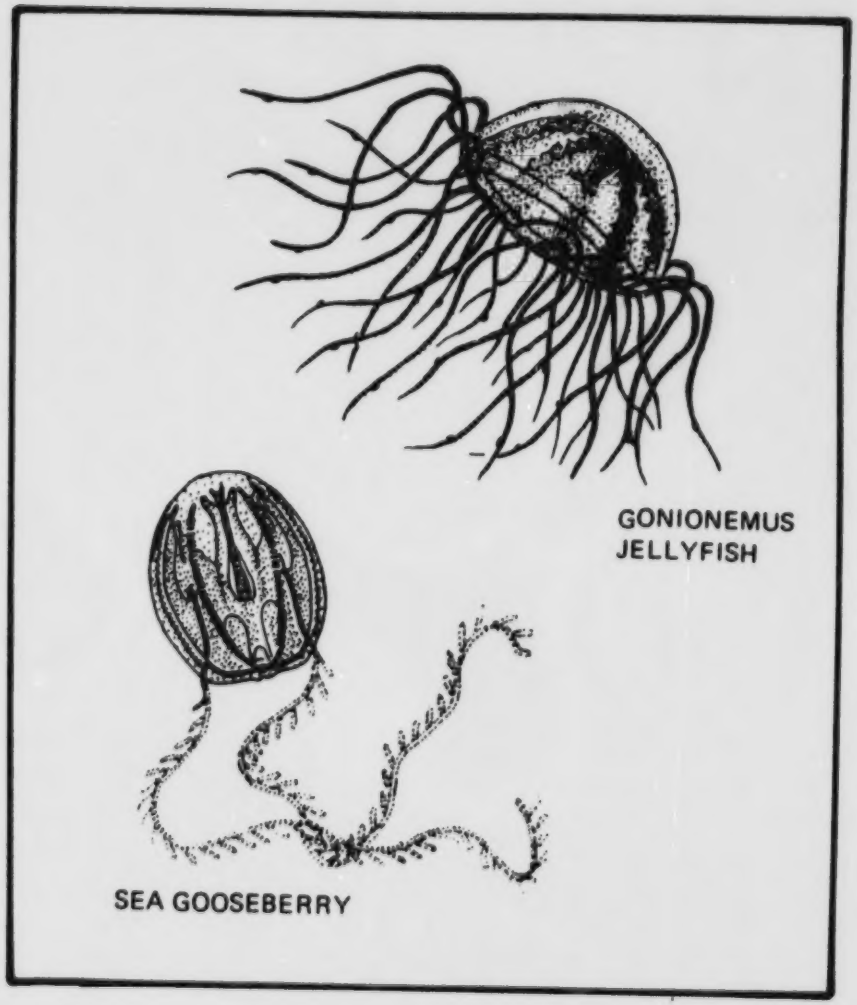
HYDROIDS

7.4.1 HYDROID/*Obelia sp.*

Description - There are several different species of *Obelia*. Some form dense branching colonies up to 10 inches in length. The tiny *Obelia geniculata* appears to be the most common species at the Wolves. *O. geniculata* reaches a maximum size of about 1 cm. Under a microscope it can be seen that the polyp bearing branches arise alternately from a single stalk. Color is white.

Habitat - At the Wolves, *O. geniculata* was found commonly on the undersurface of subtidal rocks and on kelp.

Distribution and Abundance (Figure 7.4.1)-T1-PtoA, T2-P to A, 1-P to C, 2-C to A, 4-C, 5-P, 6-P to C, 7-P to C, 8-P, 10-C to A, 11-C, 12-A, 13-A, 14-A.



7.4.2 PINK-HEARTED HYDROID/*Tubularia sp.*

Description - This hydroid usually occurs in clusters composed of several to dozens of individuals. Polyps are small but visible to the naked eye and occur singly on a 6 cm. stalk. Color - polyps are pink, stalks white

Habitat - This species occurs most abundantly, subtidally, on pilings, wharves and weir twine. It also occurs commonly, in some areas, on rocky bottom. It is common to abundant on such habitat at the Wolves.

Distribution and Abundance (Figure 7.4.1) T1-P to C, T2-P to A, 1-P to C, 2-P to C, 4-C, 6-P, 7-P to C, 8-P, 10-C, 12-C, 12-P.

7.4.3 HYDROID/ *Antennularia sp.*

Description - The entire colony of this hydroid is large, reaching 10 cm. or more in length. Polyps occur terminally on short branches arising from a central stalk. Several colonies are usually found together. Color is whitish.

Habitat - Occurs subtidally on rocks and ledges; occasionally on Horse Mussel shells. Common on rock bottom at the Wolves.

Distribution and Abundance - (Figure 7.4.1) - T1-P to C, T2-C to A, 1-P, 2-C, 4-P, 10-A, 14-C.

7.4.4 NODDING NOSEGAY/*Corymorpha pendula* Agassiz

Description - This is our largest solitary hydroid, reaching a height of 5 to 7 cm. Attached to the bottom by a root-like hold-fast. Color-Translucent, pink and white.

Habitat - Occurs most commonly, subtidally on sand and muddy sand; less commonly on mud. *C. pendula* was present on sand at two sites at the Wolves.

Distribution and Abundance (Figure 7.4.1) - 6-P, 12-P.

JELLYFISH

7.4.5 MOON JELLYFISH/*Aurelia aurita* (Linnaeus)

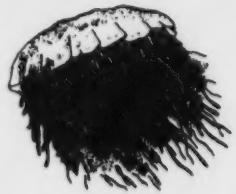
Description - This is the common Fundy Jellyfish. Reaching a foot or more in diameter when mature, it is easily distinguished by its form and four circular gonad rings. Color-transparent and white.

Habitat - Free-swimming as Jellyfish. Overwintering scyphistoma occur under rocks subtidally and in tide pools and under wharves and floats.

Commercial Importance - As previously mentioned, large numbers of this species may cause damage to weirs.

Distribution and Abundance (Figure 7.4.2) - T1-P, 11-P. While the Moon Jellyfish was only recorded at two sites it occurs abundantly, at certain times, in the waters around the Wolves.

7.4.6 RED ARCTIC JELLYFISH/*Cyanea capillata* (Linnaeus)



Description - This large (to 50 cm) Jellyfish is distinguished by a massive red and brown body and long trailing tentacles. Some people react to the sting of this species.

Habitat - Free-swimming medusae are usually rare in this area. However, in some years they occur in fairly large numbers during the summer months.

Distribution and Abundance (Figure 7.4.2) - 2-P, 12-P. While not common during this survey, the Red Arctic Jellyfish will occur commonly in the waters of the study area during some years.

7.4.7 JELLYFISH/*Halistaura sp.*

Description - This transparent Jellyfish reaches several inches in diameter. It is distinguished by gonads which form a white cross over the diameter of the animal.

Habitat - Free-swimming. While moderately common during some years, it is more rare than either of the preceeding species.

Distribution and Abundance (Figure 7.4.2) - 12-P.

7.4.8 STAUROMEDUSA

Description - Stauromedusae are sessile Jellyfish usually found attached to subtidal rock or kelp by a single stalk. This species found at the Wolves is tentatively assigned to the Genus *Haliclystus*

Distribution and Abundance (Figure 7.4.2) - 1-P, 5-A, 12-P.

SOFT CORALS

7.4.9 SOFT CORAL/*Alcyonium digitalum* Linnaeus

Description - This large soft coral occurs as a branching lobate structure growing from a single attachment. Polyps emerge over the entire body. Color is whitish to translucent pink.

Habitat - Subtidal on ledges and rocky substrates.

Distribution and Abundance (Figure 7.4.3) - T1-P, T2-A, 2-P to A, 7-P to C, 14-P. This species occurs in unusual abundance at T2 on the north end of East Wolf Island.

7.4.10 SOFT CORAL/*Gersemia rubiformis* (Pallas)

Description - A bright red branching soft coral reaching 8 to 10 cm in height. Polyps are usually terminal in clusters.

Habitat - Subtidally on ledges and rocky substrates.

Distribution and abundance (Figure 7.4.3) - 2-P to C, 3-C, 4-P.

7.4.11 UNIDENTIFIED SOFT CORAL

Description, Habitat, Distribution and Abundance (Figure 7.4.3) - A few individuals of an unidentified species of soft coral were observed at T1 on South Wolf Island.

ANEMONES

7.4.12 COMMON ANEMONE/*Metridium senile* (Linnaeus)

Description - This is the Common Fundy Anemone. It has typical anemone form and reaches 20 cm in height. Color varies from white, brown, red, orange, occasionally mottled.

Habitat - Common subtidally on pilings, weirs, floats, wharves and rocky substrate. Small individuals are occasionally found in tide pools.

Distribution and Abundance (Figure 7.4.4) - T1-P, T2-P, 2-P, 6-P. The Common Anemone was not as abundant at the Wolves as in other areas of the Bay of Fundy.

7.4.13 DAHLIA ANEMONE/*Tealia felina* (Linnaeus)

Description - This is a large colorful anemone reaching 15 cm in diameter. It is characterized by many thick tentacles and bright red color with distinctive white markings.

Habitat - Occurs most commonly, subtidally, on ledges and rocks; less commonly on pilings, floats and wharves.

Distribution and Abundance (Figure 7.4.4) - 3-P to C.

7.4.14 BURROWING ANEMONE/*Cerianthus borealis* (Verrill)

Description - Commonly referred to as "sloppy guts" this large (25 cm) burrowing anemone secretes a grey gelatinous tube in which it lives. The animal itself is light brown with large tentacles striped with green.

Habitat - Subtidally in sand, muddy sand and loose bottom. Usually in deep water.

Distribution and Abundance (Figure 7.4.4) - 6-C.

7.4.15 UNIDENTIFIED ANEMONE

Description, Habitat, Distribution and Abundance (Figure 7.4.4) - A small unidentified anemone was observed on ledge at site 1 on South Wolf Island.

SIPHONOPHORES

7.5 SIPHONOPHORE/*Cupulita cara*

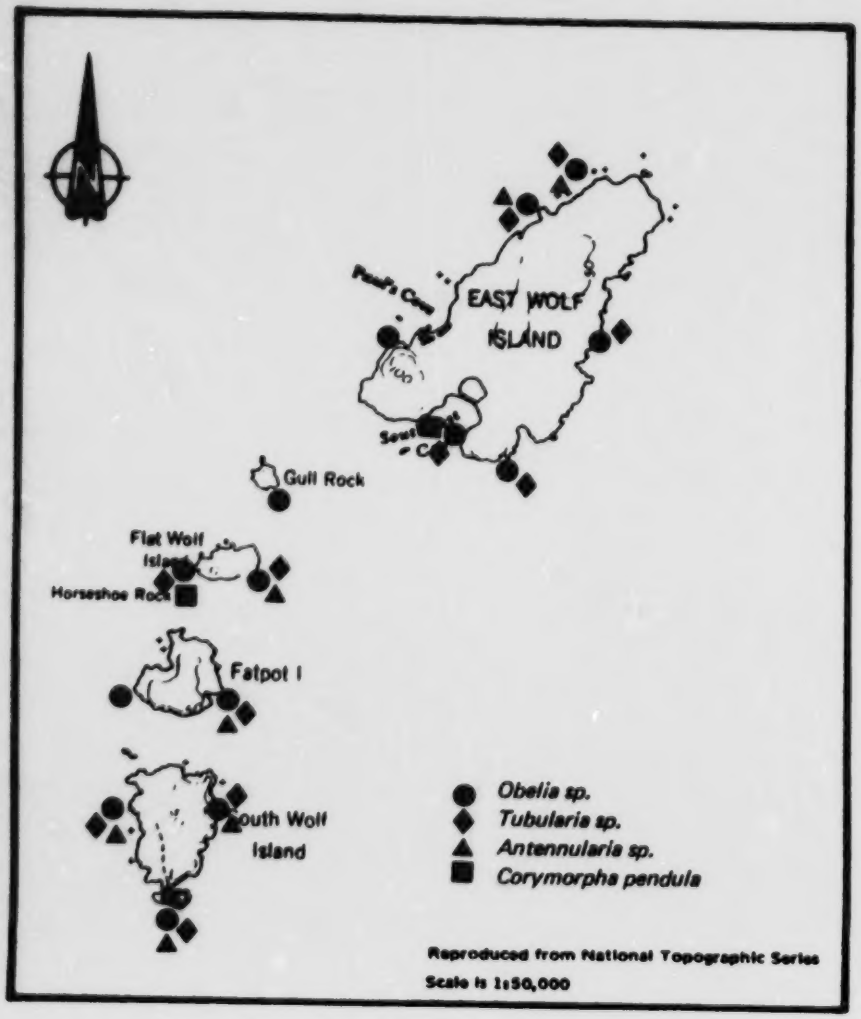
Description, Habitat, Distribution and Abundance (Figure 7.6.1) - Siphonophores include By-the-wind Sailors and Portuguese Man-of-war. Locally this group is represented by a single species, *Cupulita cara*. This is a free-swimming animal which occurs as long string-like colonies growing to 50 cm or more. This species was recorded at site 14 on South Wolf Island. It occurs abundantly in surrounding waters at irregular intervals.

COMBJELLIES

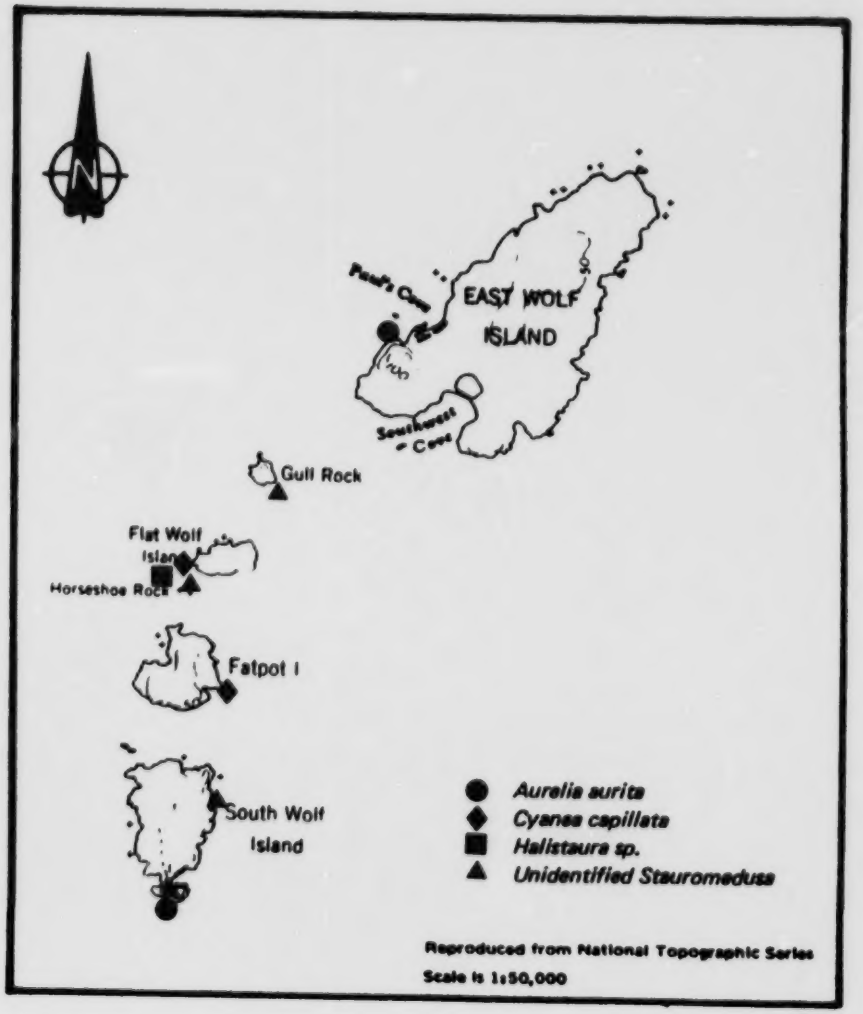
7.6 COMBJELLIES/*Beroe cucumis* Fabricius

Description, Habitat, Distribution and Abundance (Figure 7.6.1) - Combjellies are small free-swimming animals which occur abundantly in the area at irregular intervals. *Beroe cucumis* Fabricius was the only species recorded at the Wolves (sites 11-P, 12-P, 14-P. Other species which occur in the area include: *Pleurobrachia pileus* (Fabricius), *Mertensia ovum* (Fabricius), *Bolinopsis infundibulum* Muller and *Bolina alata* Agassiz.

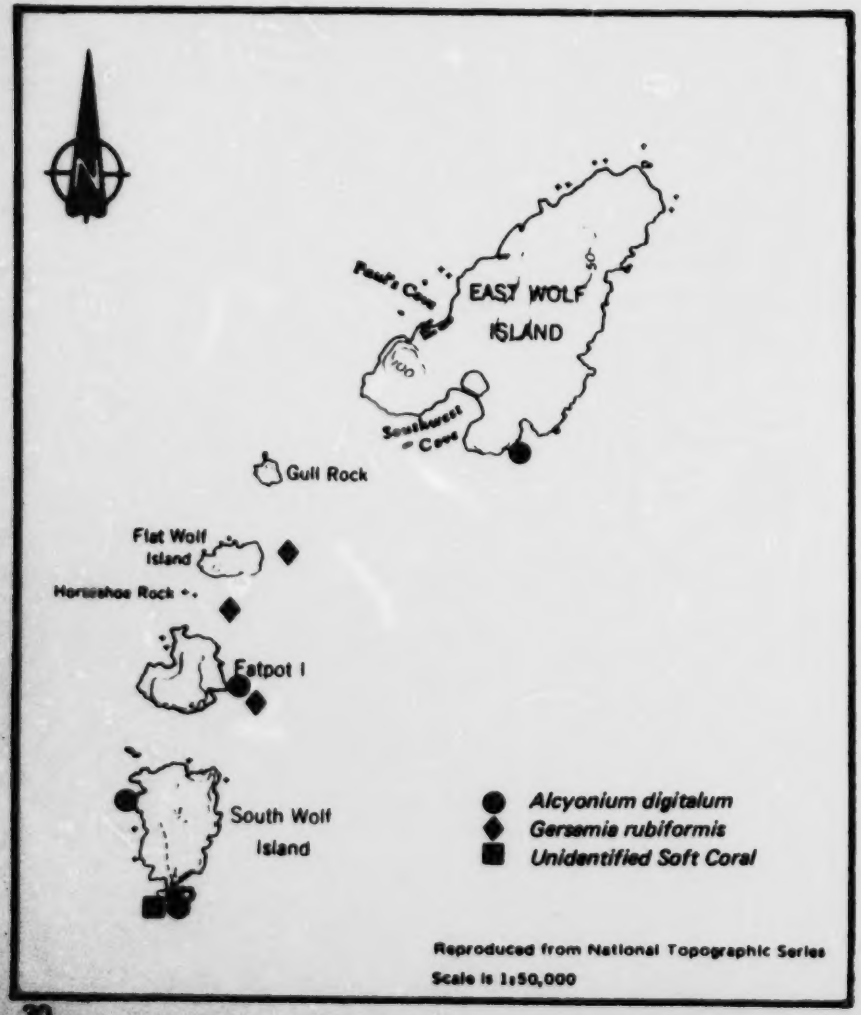
7.4.1
DISTRIBUTION OF HYDROIDS THE WOLVES ISLANDS



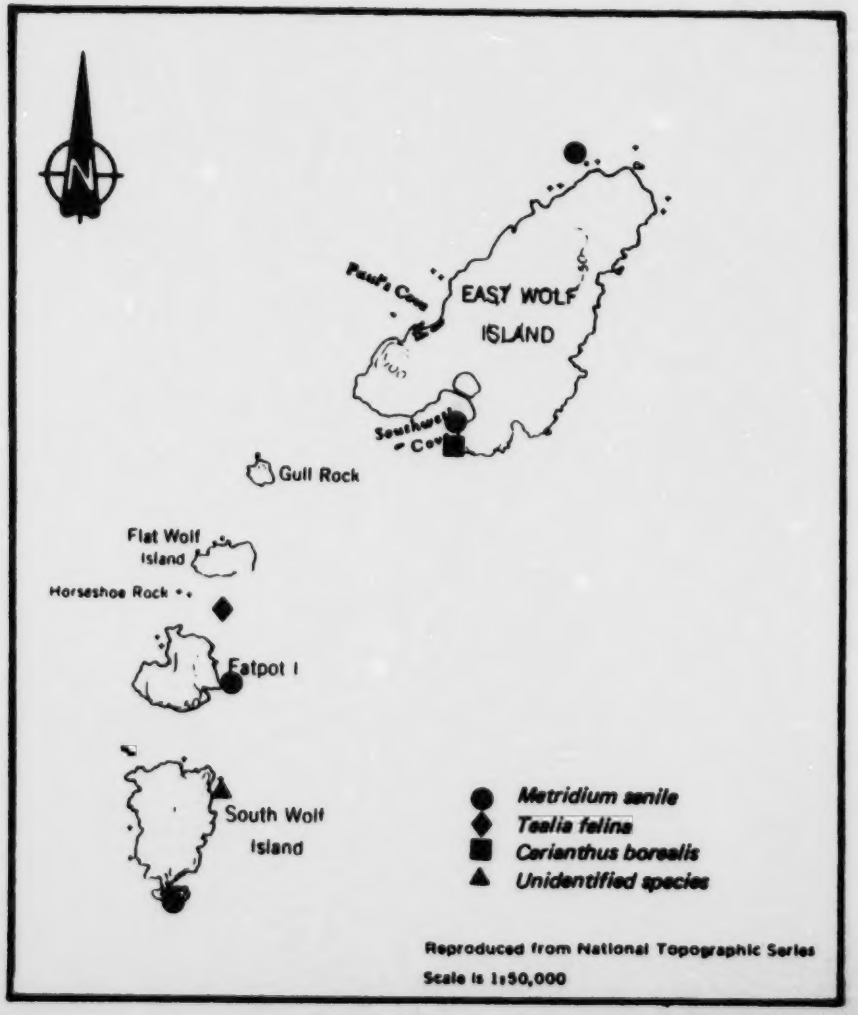
7.4.2
DISTRIBUTION OF MEDUSAE THE WOLVES ISLANDS



7.4.3
DISTRIBUTION OF SOFT CORALS **THE WOLVES ISLANDS**

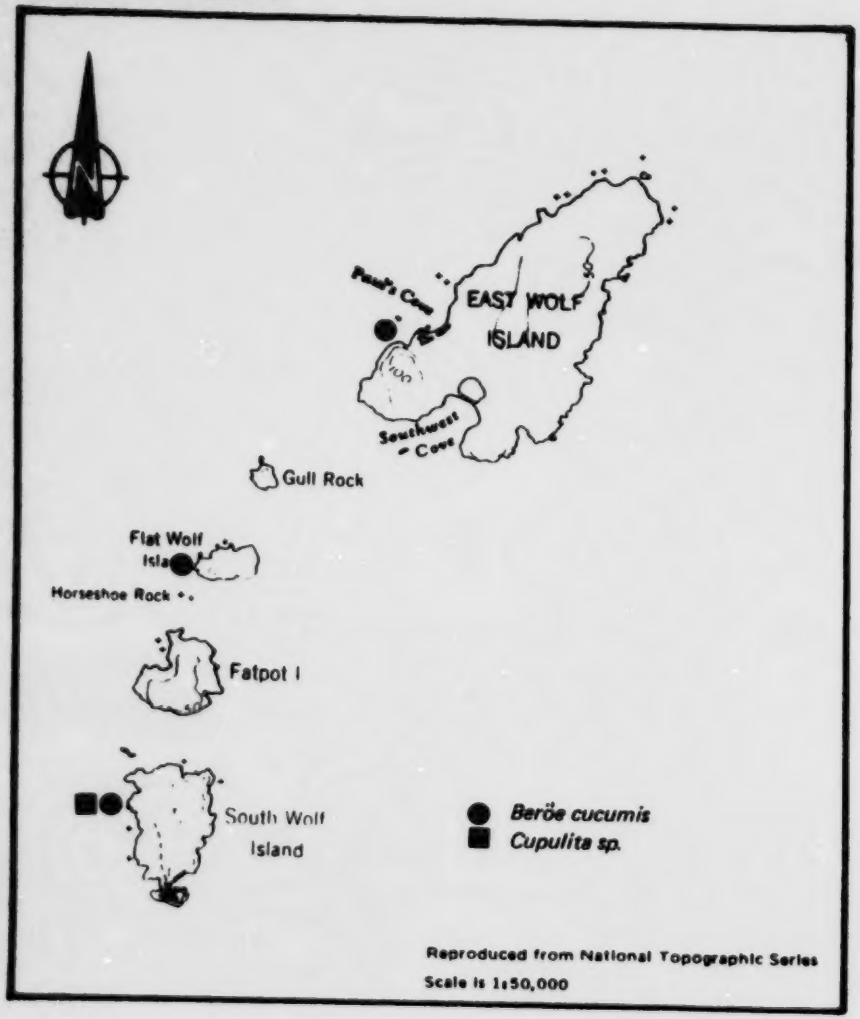


7.4.4
DISTRIBUTION OF ANEMONES **THE WOLVES ISLANDS**



7.8.1
DISTRIBUTION OF COMB JELLIES AND SIPHONOPHORES

THE WOLVES ISLANDS



ECTOPROCTA
BRACHIOPODA
(MOSS ANIMALS & BRACHIOPODS)

BRYOZOANS

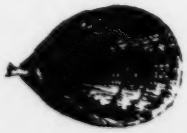
7.7 MOSS ANIMALS/*Bryozoans*

General - Bryozoans are of diverse, widespread and abundant occurrence in the study area. They occur intertidally but most commonly subtidally. Species identification is difficult and time consuming and was beyond the scope of this study. Nevertheless, general distribution and abundance was recorded for three broad groupings: 1) Subtidal erect branching, 2) Subtidal encrusting, and 3) Intertidal branching.

Distribution and abundance (Figure 7.8.1) Subtidal branching: T1-C, T2-P to A, 1-C, 2-C, 4-P, 5-P, 7-P, 8-P, 9-P, 10-C to A, 12-A, 13-A, 14-C.
Subtidal encrusting: T1-C, T2-A, 2-P to C, 4-C, 8-C, 10-C, 12-A, 13-A, 14-C.

BRACHIOPODS

7.8 ATLANTIC BRACHIOPOD/*Terebratulina septentrionalis* (Couthouy)

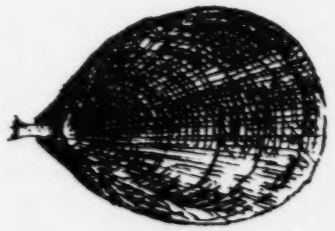


General - Brachiopods are a primitive group of bivalve-like animals which are represented by only only one species (*T. septentrionalis)* in the Bay of Fundy.

Description - Small (2 cm); 2 valves; attached to the substrate by a short stalk emerging from the hinge.

Habitat - From low water to depths in excess of 100 feet. Found on rock substrate. In shallow water this species occurs under rocks and overhangs. In deep water it occurs on the uppermost surfaces of rocks and ledges. It is common to abundant on typical habitat at the Wolves.

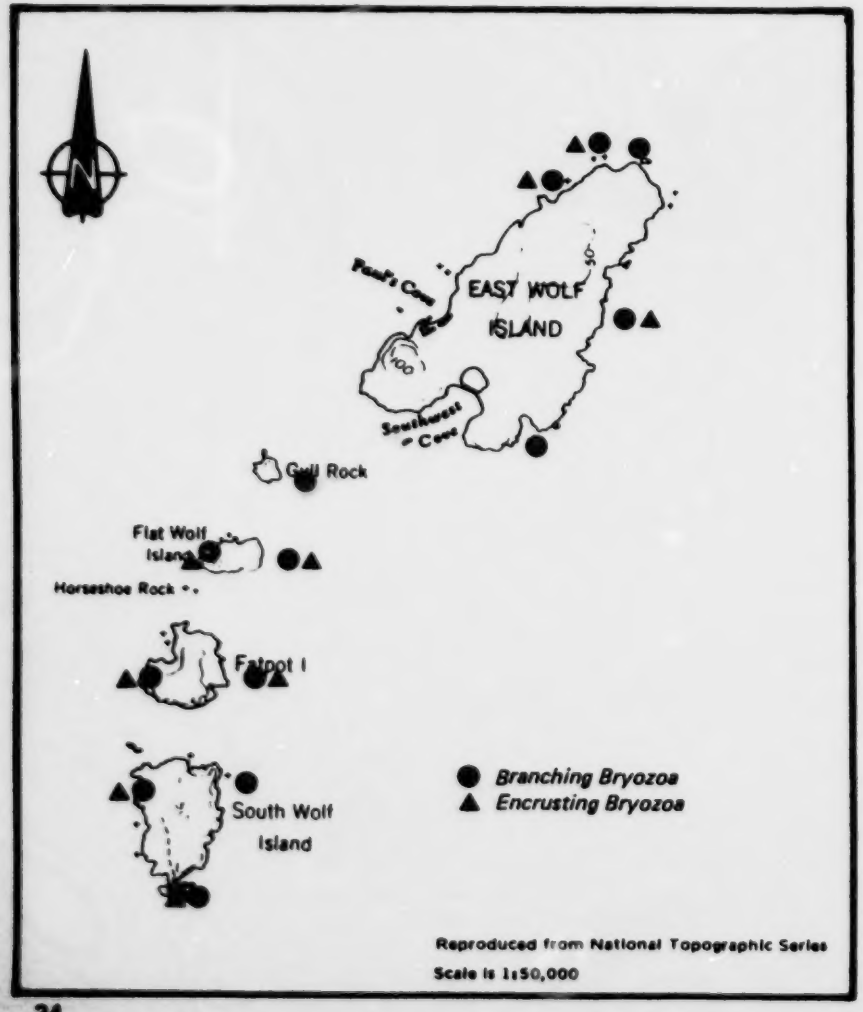
Distribution and Abundance (Figure 7.8.2) T1-A, T2-A, 1-C, 2-C to A, 3-C, 10-A, 12-A.



ATLANTIC BRACHIOPOD

7.8.1
DISTRIBUTION OF BRYOZOANS

THE WOLVES ISLANDS



7.8.2
DISTRIBUTION OF THE ATLANTIC BRACHIOPOD

THE WOLVES ISLANDS

MOLLUSCA
(CLAMS, SNAILS, SLUGS, SQUID)

7.9 INTRODUCTION

Clams, snails, nudibranchs and other molluscs form one of the most diverse and common groups in the Bay of Fundy. Over 20 species were recorded at the Wolves where they are an important part of the fauna. They occur everywhere, from high water to great depths, and on virtually every substrate.

Many species are important commercially or have potential for commercial utilization.

7.10 ANNOTATED LIST OF SPECIES

CHITONS AND LIMPETS

7.10.1 COMMON LIMPET/*Acmaea testudinalis* (Muller)

Description - This small (3 cm) cone-shaped mollusc clings to rock surfaces by a well developed muscular foot. Color-dull cream, bluish grey, irregular bars.

Habitat - Occurs commonly on rock surface intertidally above low water and to 30 or 40 feet subtidally.

Distribution and Abundance (Figure 7.10.1) - T1-P to C, T2-P to C, 1-P to C, 2-P, 4-P, 5-C, 7-P, 8-P, 9-P, 10-C, 13-C, 14-A.

7.10.2 RED CHITON/*Ischnochiton ruber* (Linnaeus)

Description - A small (2.5 cm) clinging mollusc characterized by rows of dorsal plates Color-red, mottled

Habitat - Occurs on rock from low water to 100 feet and more

Distribution and Abundance (Figure 7.10.1) - 1-P, 2-P, 3-P, 4-P, 5-P, 6-P.

7.10.3 WHITE CHITON/*Ischnochiton alba* (Linnaeus)

Description - Similar to *I. ruber* but dominant color is white.

Habitat - Occurs on rock from low water to 100 feet and more.

Distribution and Abundance (Figure 7.10.1) - 1-P, 4-P.

7.10.4 TOPSHELLS/*Margarites costalis* (Gould)
M. groenlandicus (Gmelin)

Margarites costalis

Margarites groenlandicus

Description - Small (1 cm) typical snails. Color-pink, iridescent; white and pearly.

Habitat - Occurs subtidally on rock and kelp.

Distribution and Abundance (Figure 7.10.2) - 1-P, 5-C.

7.10.5 COMMON PERIWINKLE/*Littorina littorea* (Linnaeus)

Description - A small (3 cm) snail of typical form. Brownish with grey black bands.

Habitat - Occurs intertidally on all substrates. Found in shallow subtidal areas in some localities.

Commercial Utilization - This species is gathered commercially in some areas of the Bay of Fundy. Population size and difficult shore conditions would restrict utilization of this species at the Wolves.

Distribution and Abundance (Figure 7.10.2) - 9-P.

7.10.6 TEN-RIDGED WHELK/*Neptunea decemcostata* (Say)

Description - A large (11 cm) snail characterized by prominent ridges. Color-light tan.

Habitat - Occurs subtidally on rock, sand and mixed substrate.

Commercial Utilization - While this snail is considered edible, its limited abundance and limited marketability probably preclude utilization.

Distribution and Abundance (Figure 7.10.3) - T1-P, T2-P.

7.10.7 NORTHERN WHELK/*Buccinum undatum* Linnaeus

Description - A large (10 cm) snail. Color-yellowish brown.

Habitat - Occurs subtidally on rock, mud, sand and mixed substrate.

Commercial Utilization - This is an edible snail with limited acceptance. While of widespread occurrence at the Wolves abundance is low and potential for a fishery appears poor.

Distribution and Abundance (Figure 7.10.3) - T1-P, T2-C, 2-P, 4-P, 9-P, 10-C, 12-C, 13-P, 14-P.

7.10.8 STIMPSON'S WHELK/*Colus stimpsoni* (Morch)

Description - A large (10 cm) spindle-shaped snail. Color-white and brown.

Habitat - Occurs subtidally on rock, sand and mixed substrate.

Commercial Utilization - While this snail is considered edible, low population size and limited market acceptance precludes commercial utilization.

Distribution and Abundance (Figure 7.10.3) - 10-P, 11-P.

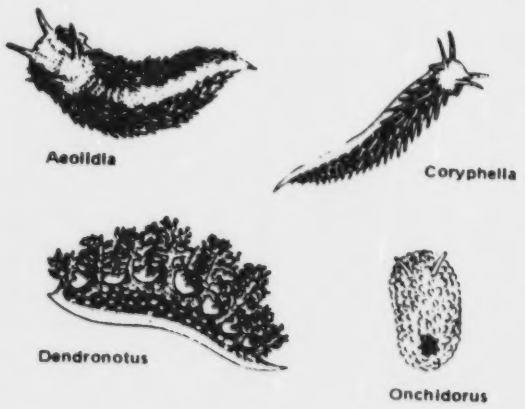
7.10.9 MOON SNAIL/*Lunatia heros* (Say)

Description - Large circular snail reaching 10 cm. Color is white and grey.

Habitat - Occurs intertidally and subtidally on sand and muddy sand bottom.

Distribution and Abundance (Figure 7.10.3) - 11-P.

7.10.10 NUDIBRANCHS/*Coryphella sp, Aeolidia papillosa* (Linnaeus), *Onchidorus sp, Dendronotus frondosus* Ascanius, etc.



Description - This group resemble terrestrial slugs. Form varies as shown in the accompanying drawings.

Habitat - Most commonly found subtidally on rocky substrate organisms, particularly near hydroids on which many species feed. Some species occur in tide pools.

Distribution and Abundance (Figure 7.10.4) -
Coryphella sp: T1-P, T2-P, 2-C, 8-P, 11-P.
Aeolidia papillosa: T2-P
Onchidorus sp: 2-P, 8-P
Dendronotus frondosus: 4-P
Unidentified species: 10-A

BIVALVES

7.10.11 GIANT SEA SCALLOP/*Placopecten magellanicus* (Gmelin)

Description - A large bivalve reaching 20 cm in diameter. Color-brown, tan upper valve, and whitish bottom valve.

Habitat - Occurs subtidally on sand, sandy mud and mixed bottoms.

Commercial Utilization - This species is fished commercially at the Wolves. See the section on the fishery for further information.

Distribution and Abundance (Figure 7.10.5) - 10-P

7.10.12 ICELAND SCALLOP/*Chlamys islandicus* (Muller)

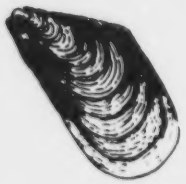
Description - A small (10 cm) scallop with a "winged" hinge. Reddish brown; often encrusted

Habitat - Occurs subtidally attached to ledge in cracks and crevices and under rocks.

Commercial Utilization - This species is not harvested commercially. It is rare and can only be obtained easily by divers.

Distribution and Abundance (Figure 7.10.5) - 12-P

7.10.13 BLUE MUSSEL/*Mytilus edulis* Linnaeus



Description - An elongated bivalve reaching 8 cm. Color-dark blue and black.

Habitat - Most common on rock substrate near low water.

Commercial utilization - Blue mussels are abundant at the Wolves. However, they are generally small and commercial utilization is unlikely.

Distribution and Abundance (Figure 7.10.6) - T1-C, T2-A, 1-A, 2-P to C, 3-A, 4-A, 5-A, 6-A, 7-A, 8-C, 9-P, 10-C, 11-P, 12-A, 13-A, 14-A.

7.10.14 HORSE MUSSEL/*Modiolus modiolus* (Linnaeus)

Description - This is a large (16 cm) bivalve resembling the blue mussel. Color - bluish black.

Habitat - Occurs most commonly subtidally attached to rocky substrates. Occasionally found buried in mud and sand in tide pools and near low water.

Commercial Utilization - The aductor muscle of this species is edible and marketable. Potential exists for harvesting by divers.

Distribution and Abundance (Figure 7.10.6) - T1-P, T2-P, 1-P, 2-P, 3-C, 4-P, 6-P, 7-P, 9-P, 10-P to C, 12-C, 13-C, 14-C.

7.10.15 ARCTIC SAXICAVE/*Hiatella arctica* (Linnaeus)

Description - A small (5 cm) clam with poorly formed valves; white.

Habitat - Occurs subtidally with other bivalves on rock bottom, on pilings, floats and wharves. Occasionally found intertidally.

Distribution and Abundance (Figure 7.10.7) - 4-P.

7.10.16 RAZOR CLAM/*Ensis directus* (Conrad)

Description - An elongated clam which resembles a straight razor. Generally blackish in color.

Habitat - Empty shells were observed subtidally on sand.

Distribution and Abundance (Figure 7.10.7) - 11-P (shells only)

7.10.17 ASTARTE/*Astarte sp.*

Description - A small (32-38 mm) yellowish-brown clam distinguished by prominent concentric ridges following the shape of the shell.

Habitat - Common subtidally in sand, muddy-sand and firm mud substrates.

Distribution and Abundance (Figure 7.10.7) - 11-P.

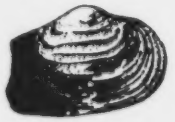
7.10.18 NORTHERN HEART SHELL/*Venericardia borealis* (Conrad)

Description - Up to 38 mm. Color-greyish white. Valves have distinct rays running from the hinge to the outer margins.

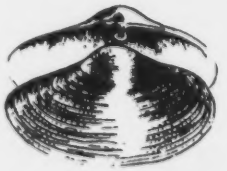
Habitat - Common subtidally in sand, muddy-sand and firm mud substrates.

Distribution and Abundance (Figure 7.10.7) - 11-P.

7.10.19 SOFT-SHELLED CLAM/*Mya arenaria* Linnaeus
M. truncata Linnaeus



Mya truncata



Mya arenaria

Description - A plain white clam reaching 8 cm.

Habitat - Occurs intertidally in mud, muddy-sand and sand.

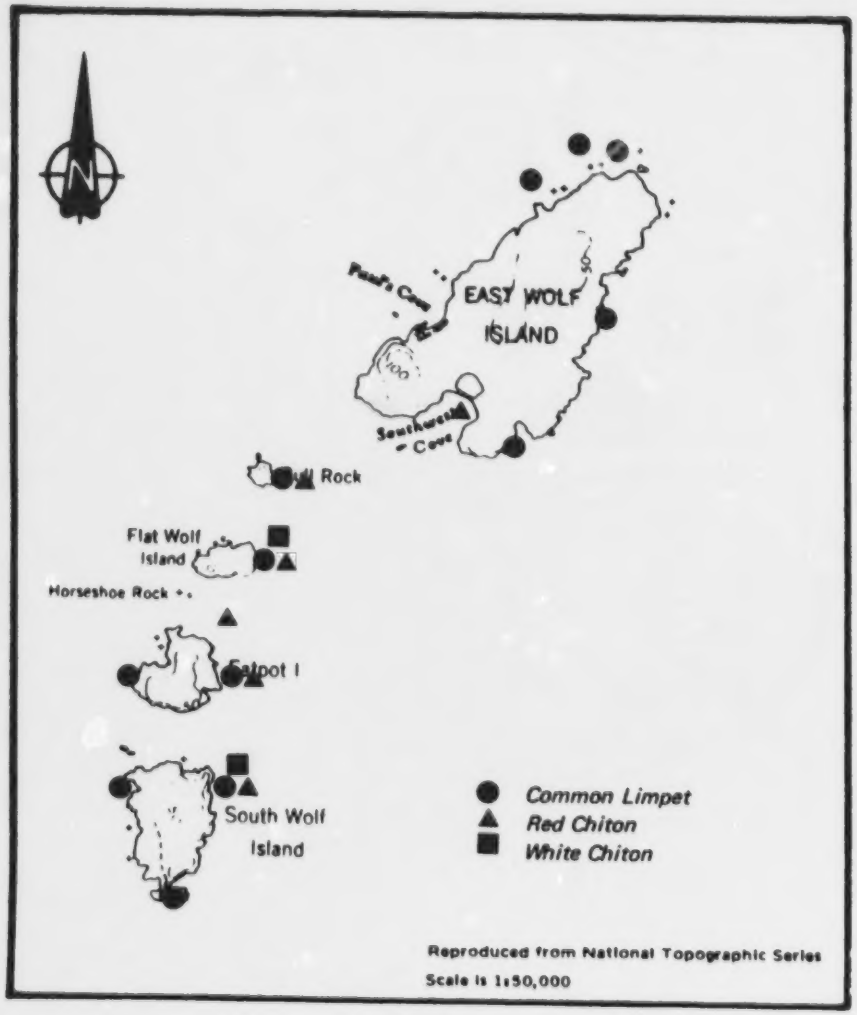
Commercial Utilization - This is an important commercial species. Habitat is limited at the Wolves and large scale harvesting is not possible.

Distribution and Abundance (Figure 7.10.7) - Occurs in suitable habitat on East Wolf Island. ***Mya truncata:*** Empty shells were recorded as common at site 13.

7.10.1

DISTRIBUTION OF LIMPETS AND CHITONS

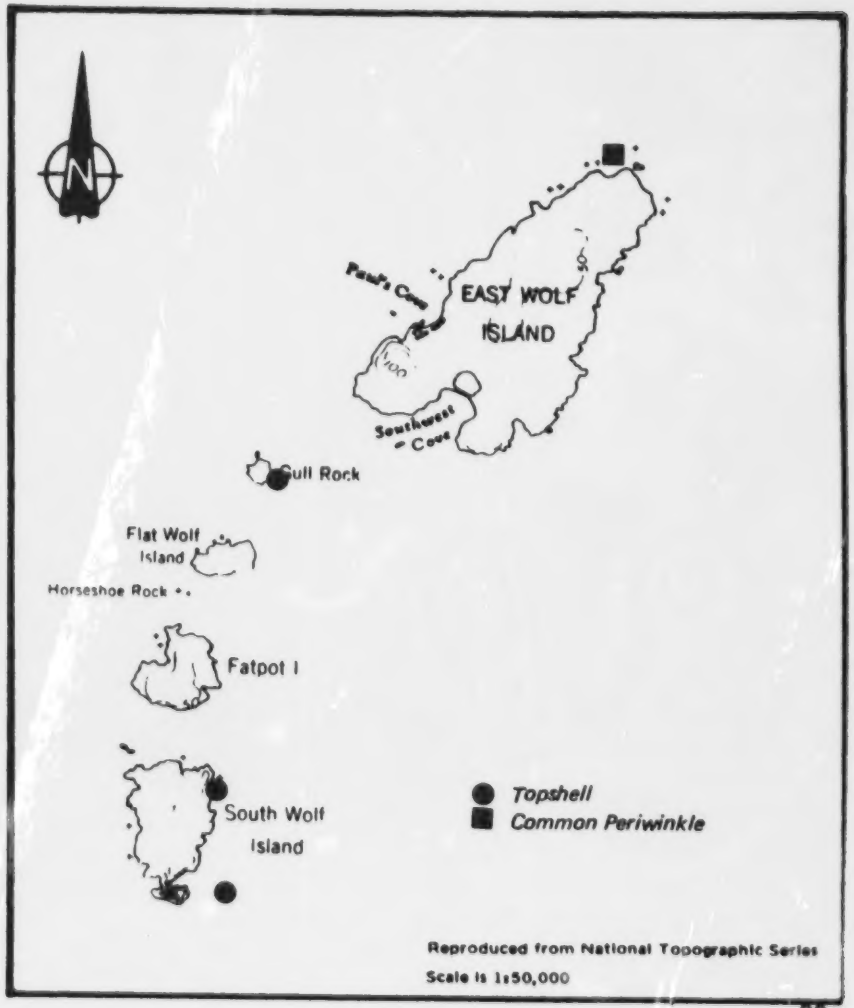
THE WOLVES ISLANDS



7.10.2

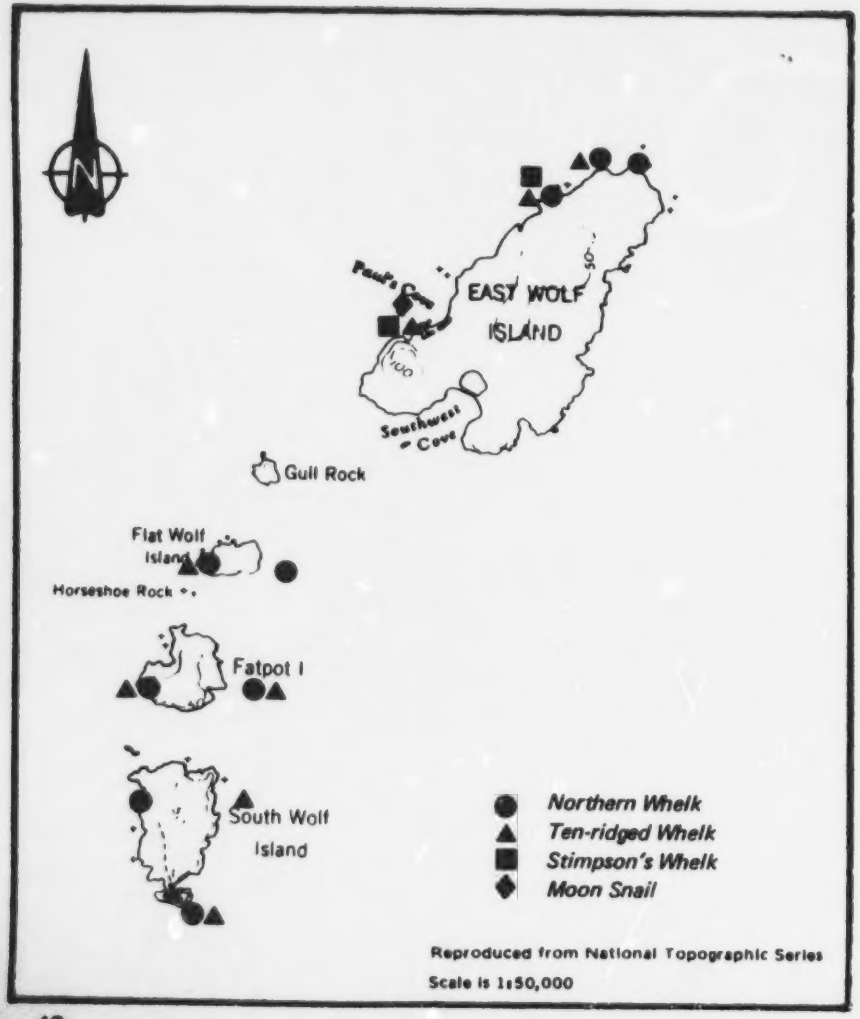
DISTRIBUTION OF TOPSHELLS AND THE COMMON PERIWINKLE

THE WOLVES ISLANDS



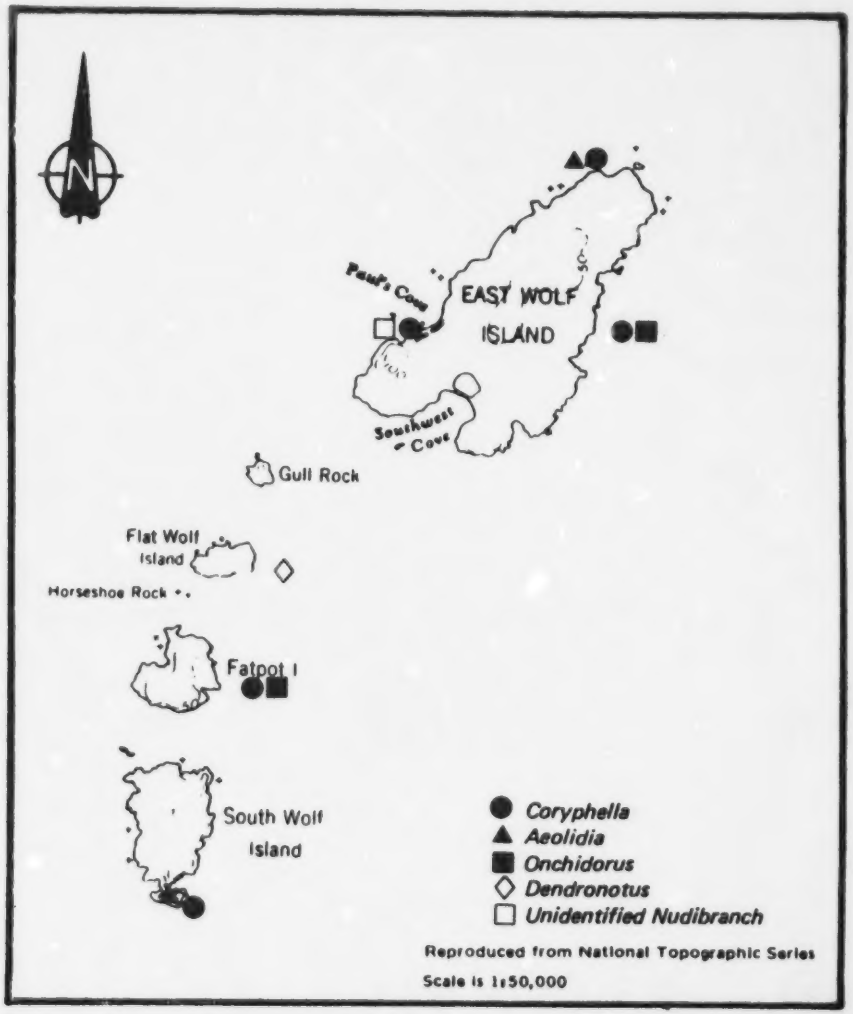
7.10.3
DISTRIBUTION OF GASTRO-PODS

THE WOLVES ISLANDS



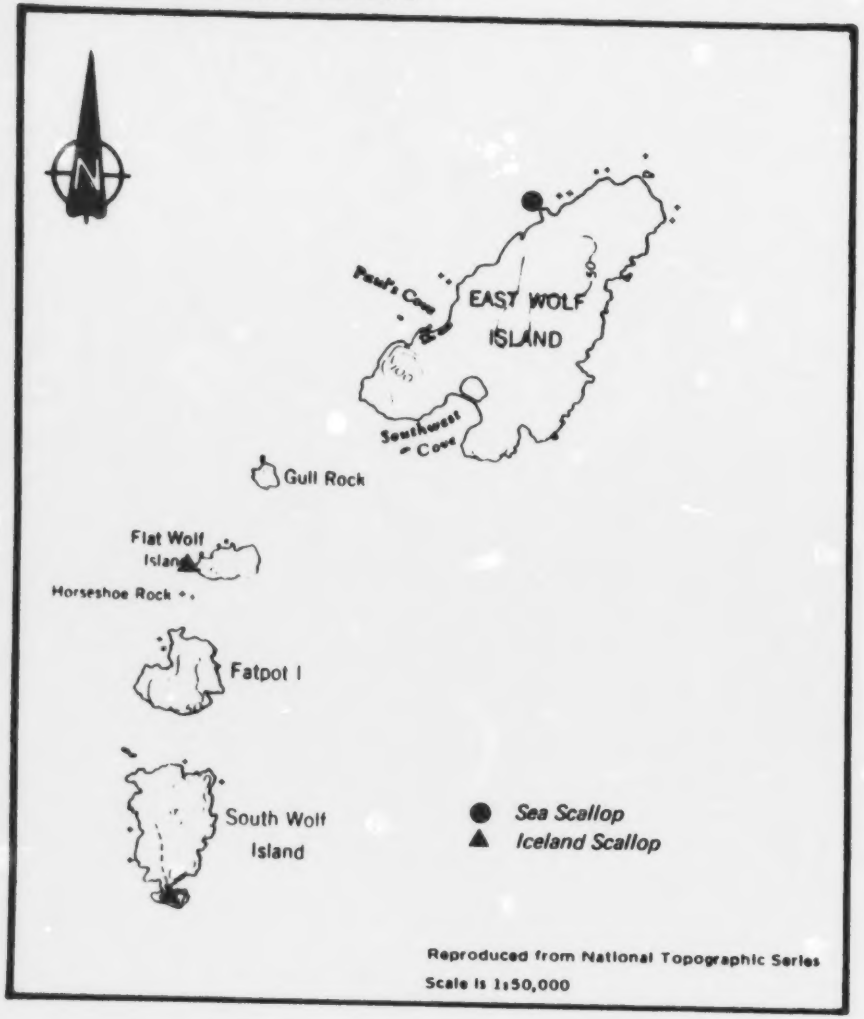
7.10.4
DISTRIBUTION OF NUDIBRANCHS

THE WOLVES ISLANDS



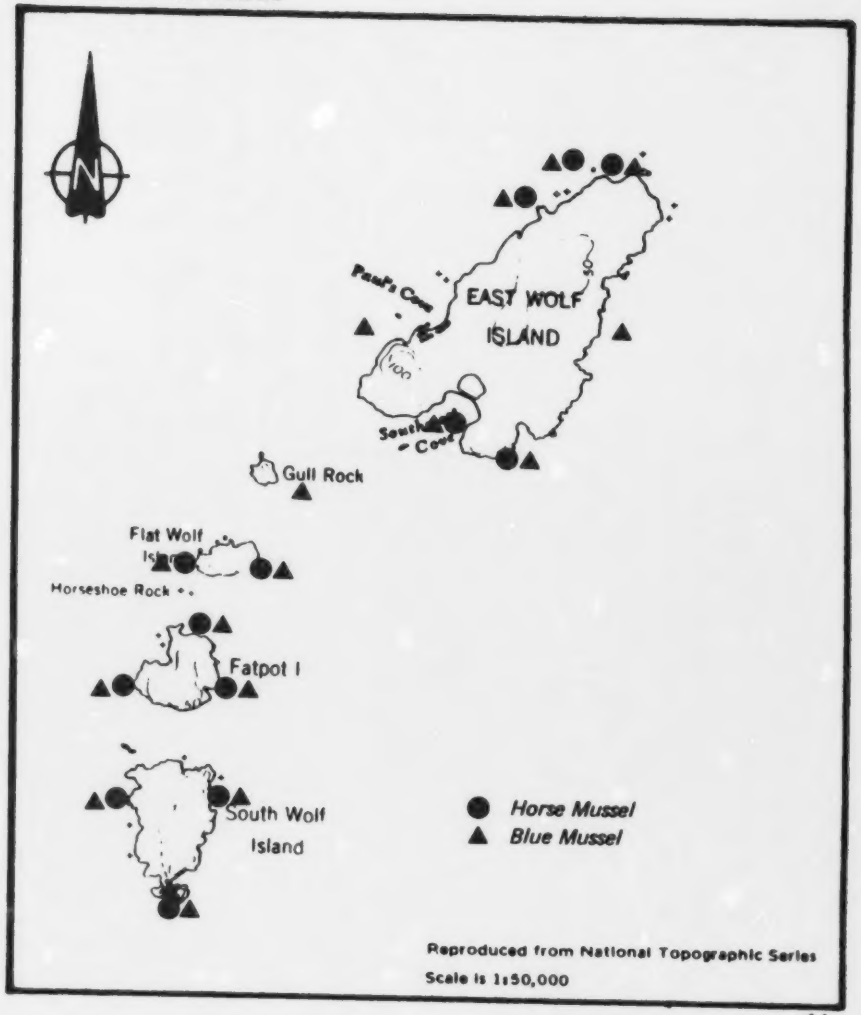
7.10.5
DISTRIBUTION OF SEA SCALLOPS AND ICELAND SCALLOPS

THE WOLVES ISLANDS

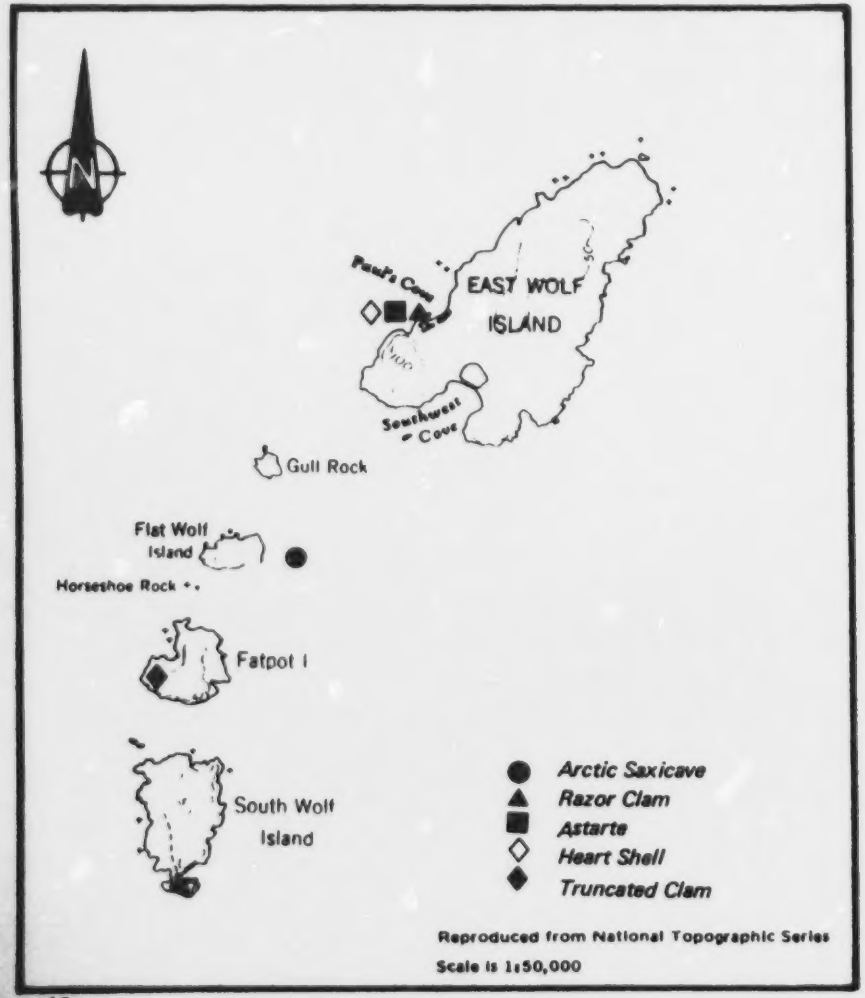


7.10.6
DISTRIBUTION OF BLUE MUSSELS AND HORSE MUSSELS

THE WOLVES ISLANDS



7.10.7
DISTRIBUTION OF BIVALVES THE WOLVES ISLANDS



ANNELIDA
(SEGMENTED WORMS)

7.11 INTRODUCTION

Numerous species of segmented worms occur abundantly in every habitat in the Bay of Fundy. They are particularly common in mud. Consequently, many species in subtidal mud are not likely to be recorded unless mud samples are taken, seived and sorted. Since this was beyond the scope of this survey, it can be expected that other species occur at the Wolves.

7.12 ANNOTATED LIST OF SPECIES

7.12.1 TUBE WORM/*Potamilla reniformis* (Leuckart)

Description - Up to 10 cm long, this worm secretes a tough leathery tube from which its banded tentacles emerge.

Habitat - Occurs subtidally in cracks in ledge and rock.

Distribution and Abundance (Figure 7.12.1) - T1-P, 4-P, 14-P.

7.12.2 COILED TUBE WORM/*Spirorbis borealis* Daudin

Description - This tiny (2-3 mm) worm lives in a small pasty-white coiled tube.

Habitat - Occurs intertidally and subtidally on rocks and algae. Often extremely abundant.

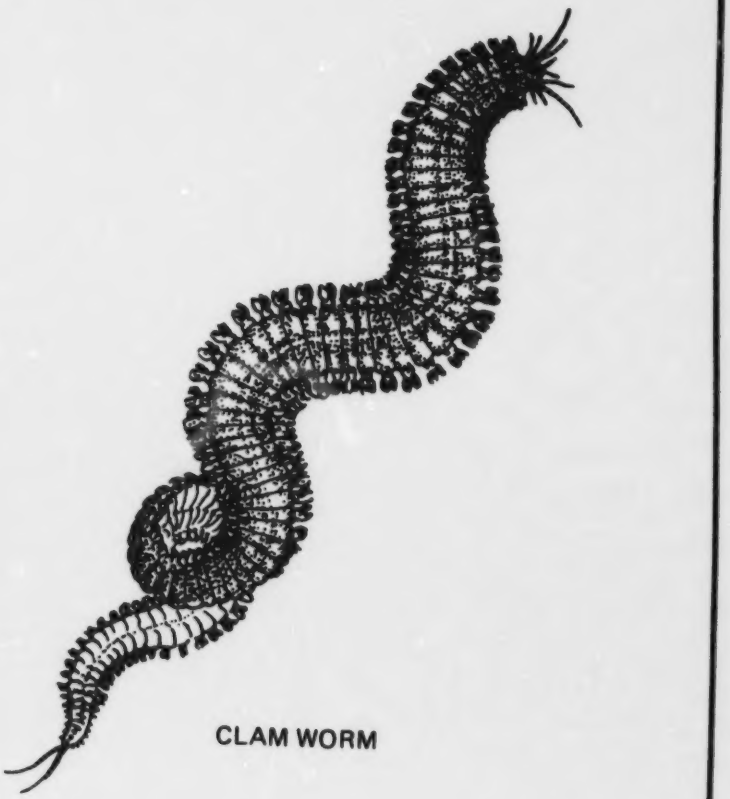
Distribution and Abundance (Figure 7.12.1) - T2-A, 1-P, 4-P, 5-C, 7-P to C, 8-P, 9-P, 10-A, 13-A.

7.12.3 SCALEWORM/*Lepidonotus squamatus* (Linnaeus)

Description - Up to 5 cm long, scale worms are characterized by two rows of dorsal scales.

Habitat - Occurs intertidally and subtidally under stones and debris.

Distribution and Abundance (Figure 7.12.1) - 4-P, 5-P, 7-P, 13-P to C, 14-P.



CLAM WORM

7.12.4 TUBE WORM/*Filograna implexa* Berkeley

Description - Tiny worms form intertwining masses of tiny, slender white tubes. Masses may reach 6 inches or so in diameter.

Habitat - Occur subtidally, usually on rocky bottom.

Distribution and Abundance (Figure 7.12.1) - 7-P, 10-P.

7.12.5 TUBE WORM/*Amphitrite johnstoni* Malmgren

Description - Up to 20 cm long this tube worm lives in tubes constructed from mud.

Habitat - Intertidally in mud, among blue mussels and under rocks, particularly in tide pools. Subtidally occurs in cracks in ledges and rocks and under stones.

Distribution and Abundance (Figure 7.12.4)- 8-P

7.12.6 FEATHERED FAN WORM/*Myxicola infundibulum* (Montagu)

Description - This species reaches 8 cm, contracted length. It is characterized by its gelatinous tube and funnel-shaped brachial crown.

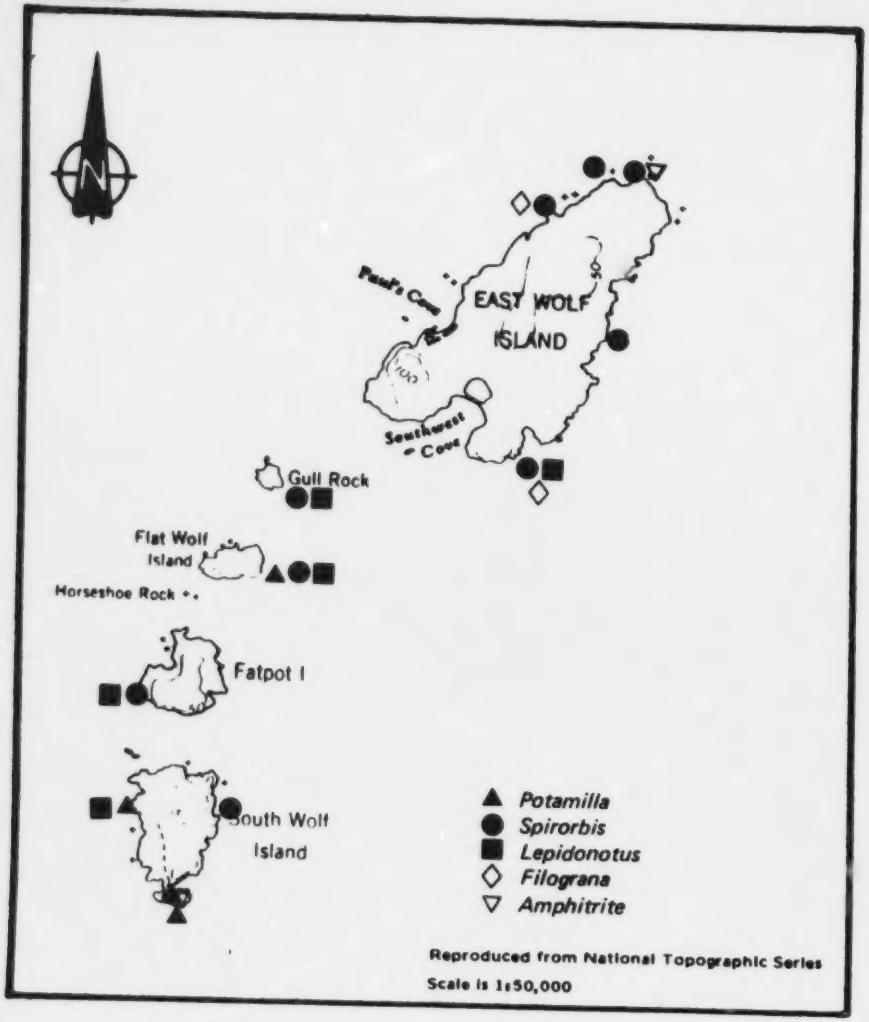
Habitat - Occurs subtidally from low water to 100 feet and more. Most commonly found in cracks in bedrock, under rocks, among Horse Mussels and in loose rock debris.

Commercial Utilization - *M. infundibulum* is an important commercial species used in neurophysiological research. Natural stocks at the Wolves are too limited to support commercial harvesting.

Distribution and Abundance (Figure 7.12.2) - T1-P, T2-P to C, 1-P, 2-P, 3-P, 4-P, 6-P, 8-P, 12-P.

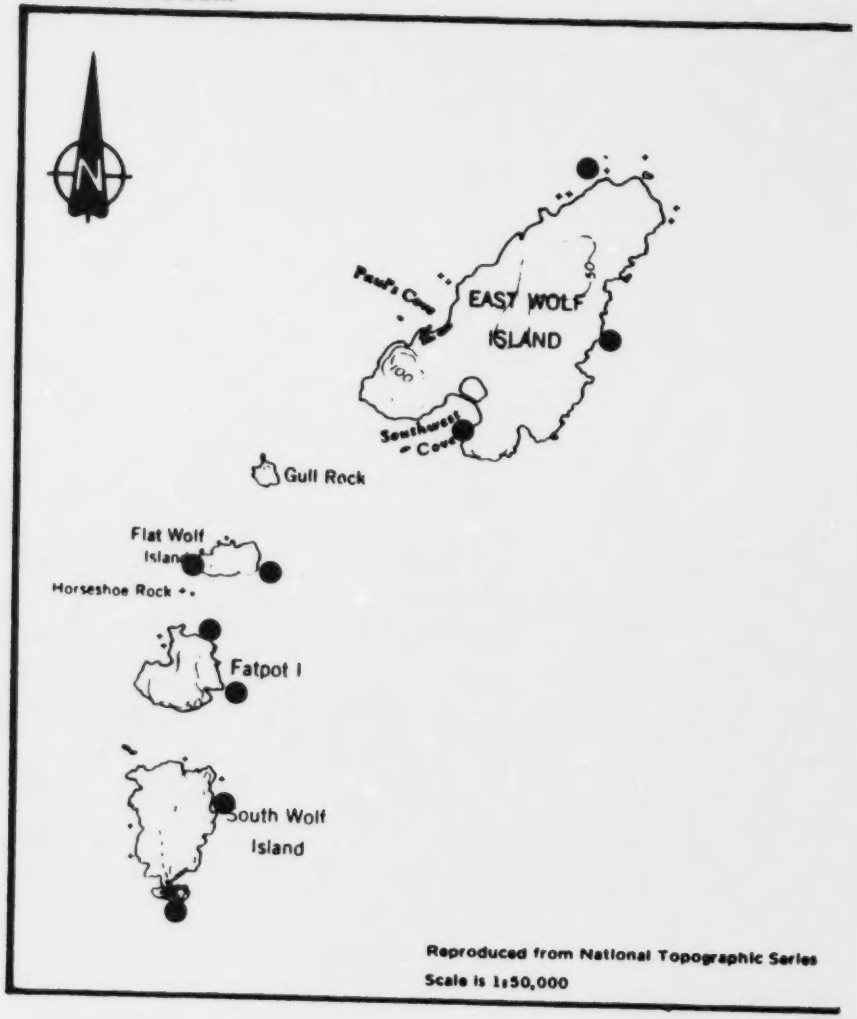
7.12.1
DISTRIBUTION OF ANNELID WORMS

THE WOLVES ISLANDS



7.12.2
DISTRIBUTION OF MYXICOLA INFUNDIBULUM

THE WOLVES ISLANDS



ARTHROPODA
(CRABS, LOBSTER, SHRIMP, ETC.)

7.13 INTRODUCTION

Shrimps, crabs, barnacles, amphipods, lobster and other arthropods form one of the dominant groups in the Bay of Fundy. They are found on all substrates intertidally to high water and subtidally to great depths. At the Wolves all major species are well represented.

Lobster and shrimp are important commercial species and the Rock Crab, which has potential for commercial utilization, is abundant in the study area.

7.14 ANNOTATED LIST OF SPECIES

7.14.1 SHRIMP/*Pandalus montagui* (Leach)

Description - Smooth carapace; to 3 inches; transparent with red and blue stripes.

Habitat - Occurs subtidally on various substrates from low water to depths of 100 feet. Particularly abundant around ledges and boulders where it finds shelter in crevices and under overhangs.

Commercial Utilization - Fished commercially by draggers along with the larger species *Pandalus borealis*.

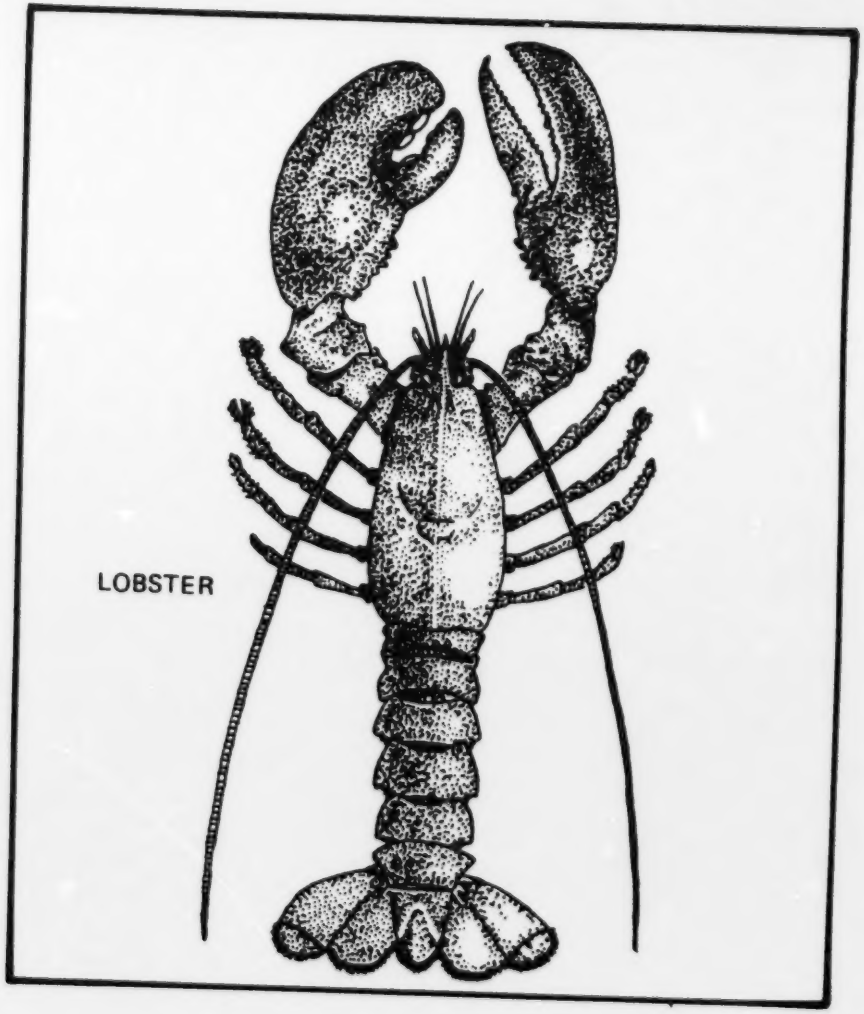
Distribution and Abundance (Figure 7.14.1) - T1-P, T2-C, 1-P, 5-P, 7-P, 8-P, 13-P.

7.14.2 SHRIMP/*Spirontocaris sp.*

Description - Large teeth on back of carapace; to 2½ inches; color-varies; most commonly shades of brown and white.

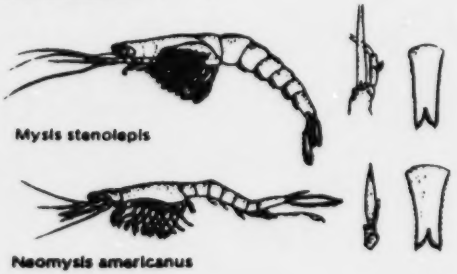
Habitat - Occurs subtidally from low water to depths in excess of 100 feet. Commonly found living in kelp beds.

Distribution and Abundance (Figure 7.14.1)- T2-C.



LOBSTER

7.14.3 FAIRY SHRIMP/*Mysis sp.*



Description - To 1¼ inches; transparent with prominent black eyes.

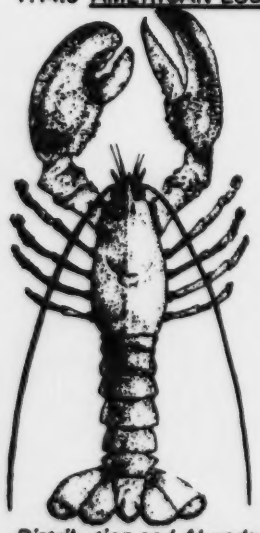
Habitat - Occurs intertidally in ponds and tide pools. Commonly found just below low tide in summer. It appears to drop to lower depths during winter months. Normally swims just above the bottom; most commonly on mud or sand substrates.

Distribution and Abundance - (Figure 7.14.1) - 9-P.

7.14.4 UNIDENTIFIED SHRIMP

General - A number of unidentified small shrimp were recorded at site 10 on ledge and boulders.

7.14.5 AMERICAN LOBSTER/*Homarus americanus* (Milne - Edwards)



Description - Average size for market-10 inches and 1 to 2 pounds but recorded to 34 inches; dark green above, yellow, orange, red, below.

Habitat - Occurs subtidally from low water to depths in excess of 100 feet on a variety of substrates. Usually observed in burrows under rocks or holes in ledges during late summer and fall.

Commercial Utilization - Although it was recorded at only one site, a good commercial fishery exists for this species in the study area. See section 9 for additional details.

Distribution and Abundance - (Figure 7.14.2) 6-A.

7.14.6 COMMON BARNACLE/*Balanus balanoides* (Linnaeus)

Description - less than ½ inch; white.

Habitat - Occurs intertidally on rocks, wharves and pilings. Most common near the middle of tidal zone to high water.

Distribution and Abundance (Figure 7.14.3) - T1-A, T2-C, 1-C to A, 2-P to A, 4-A, 7-A, 8-A, 10-A, 12-C.

7.14.7 GOOSE BARNACLE/*Lepas sp.*

Description - Shell thin, paper-like, stalk fleshy; to 2 inches; white, bluish white.

Habitat - Occurs on seaweed, wood or other floating objects. Often found in large patches of drift weed, solitary or in large groups. Appears to be seasonal in the study area; occurring only in the summer months.

Distribution and Abundance (Figure 7.14.3) - 1-P, 12-P.

7.14.8 CAPRELLIDS/*Caprella sp.*

Description - Slender body; to 1 inch; translucent, reddish, red, or mottled.

Habitat - Occurs subtidally on hydroids, sponges, tunicates, etc. It is particularly abundant on weir twine at times.

Distribution and Abundance (Figure 7.14.4) - T1-P, T2-A, 1-P, 2-C, 4-P, 7-C, 10-P, 11-C.

7.14.9 AMPHIPOD/*Tryphosa pinguis*

Description - to 1 cm; pink, white.

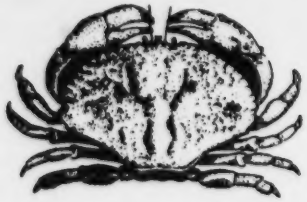
Habitat Occurs subtidally, usually on mud bottoms, from low water to depths in excess of 100 feet; often found feeding on dead fish.

Distribution and Abundance (Figure 7.14.4) 11-C.

7.14.10 UNIDENTIFIED AMPHIPODS

General - A number of unidentified amphipods were recorded intertidally at site 10 and subtidally on Transect T2; both on hard substrate.

7.14.11 ROCK CRAB/*Cancer borealis* (Stimpson)



Description - Heavy carapace; to 6 inches; brick red dorsally, white, yellow ventrally.

Habitat - Occurs subtidally on varied substrates from low water to depths in excess of 100 feet. Occasionally found intertidally buried in sand or under rocks.

Commercial Utilization - Good potential exists for a fishery with some markets developing at the present time. See section 9 for further details.

Distribution and Abundance (Figure 7.14.5) - T1-P, 4-P, 6-P, 8-P, 9-P, 12-P, 14-P.

7.14.12 HERMIT CRAB/*Pagurus sp.*

Description - Lives in various empty Gastropod shells; soft-bodied except for legs and claws; usually red with white, some with blue. One common species is covered with brown hairs.

Habitat - Occurs subtidally from low water to depths in excess of 100 feet; on all substrates. Rarely found intertidally in tide pools.

Distribution and Abundance (Figure 7.14.5) - T1-P, 1-P, 4-P, 5-P, 6-C, 7-P, 8-P, 10-P, 11-C to A, 12-C, 13-P, 14-P.

7.14.13 TOAD CRAB/*Hyas sp.*

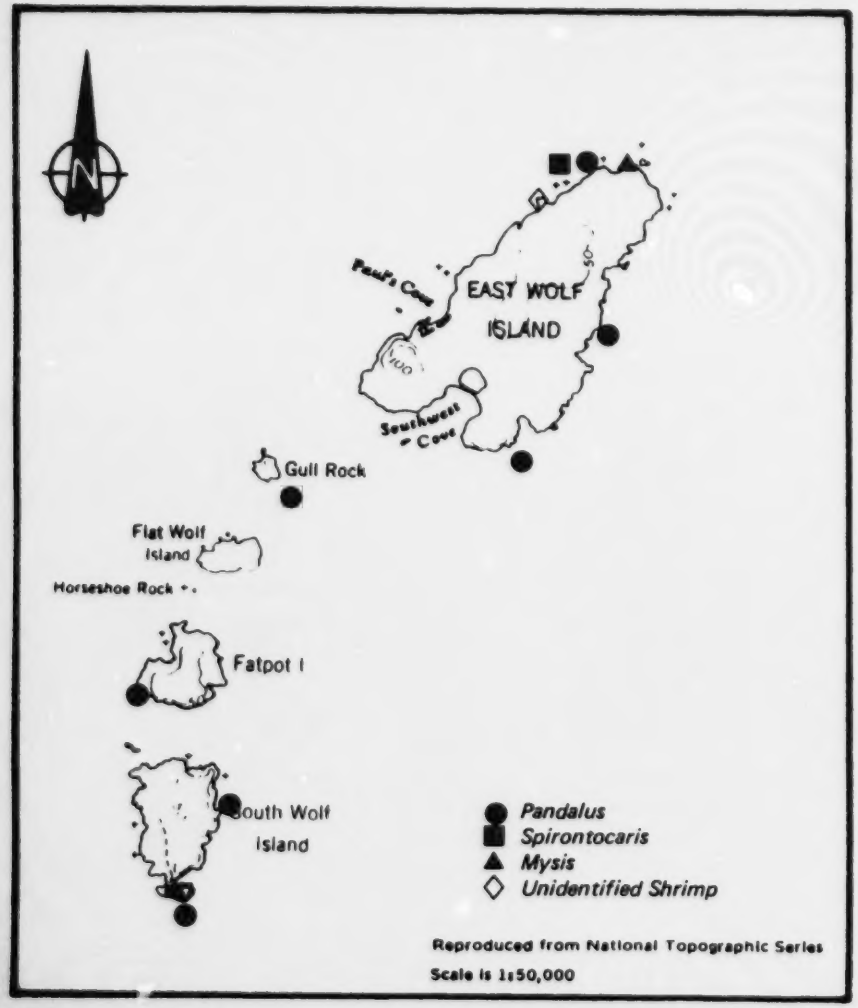
Description - To 3 inches in body length; brick red to dirty brown; often decorated with sponges etc.

Habitat - Occurs subtidally from low water to depths in excess of 100 feet on various substrates.

Distribution and Abundance (Figure 7.14.5) - 2-P, 13-P.

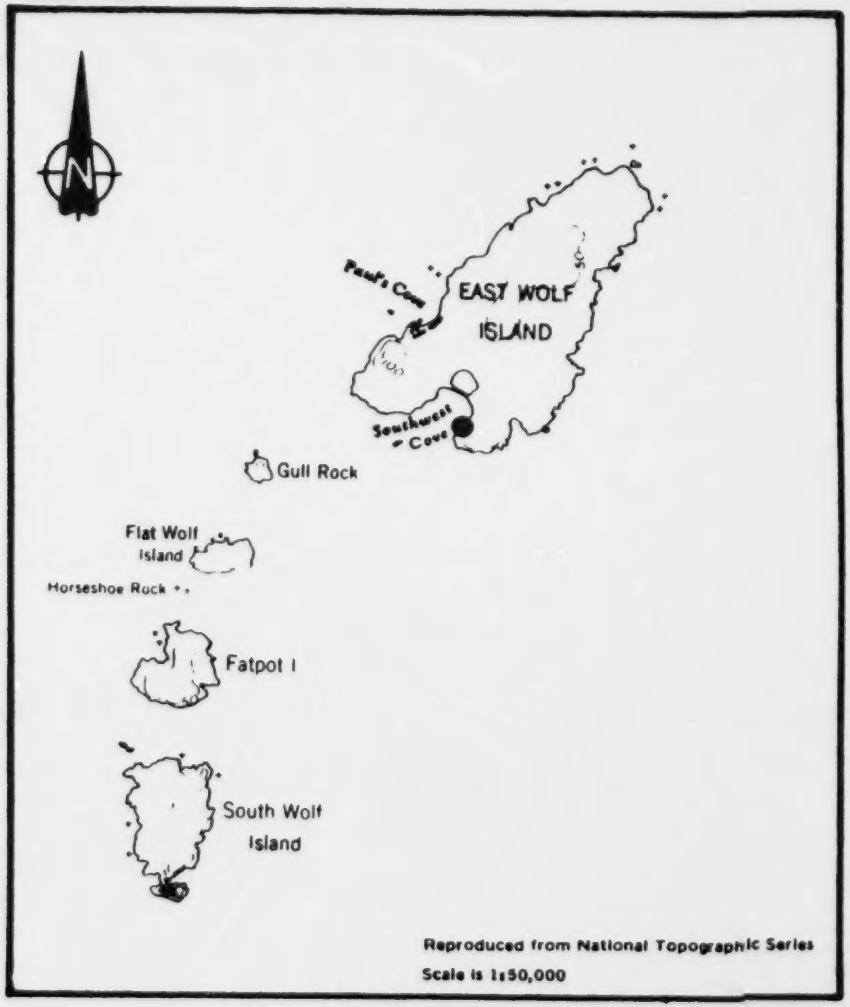
7.14.1
DISTRIBUTION OF SHRIMP

THE WOLVES ISLANDS



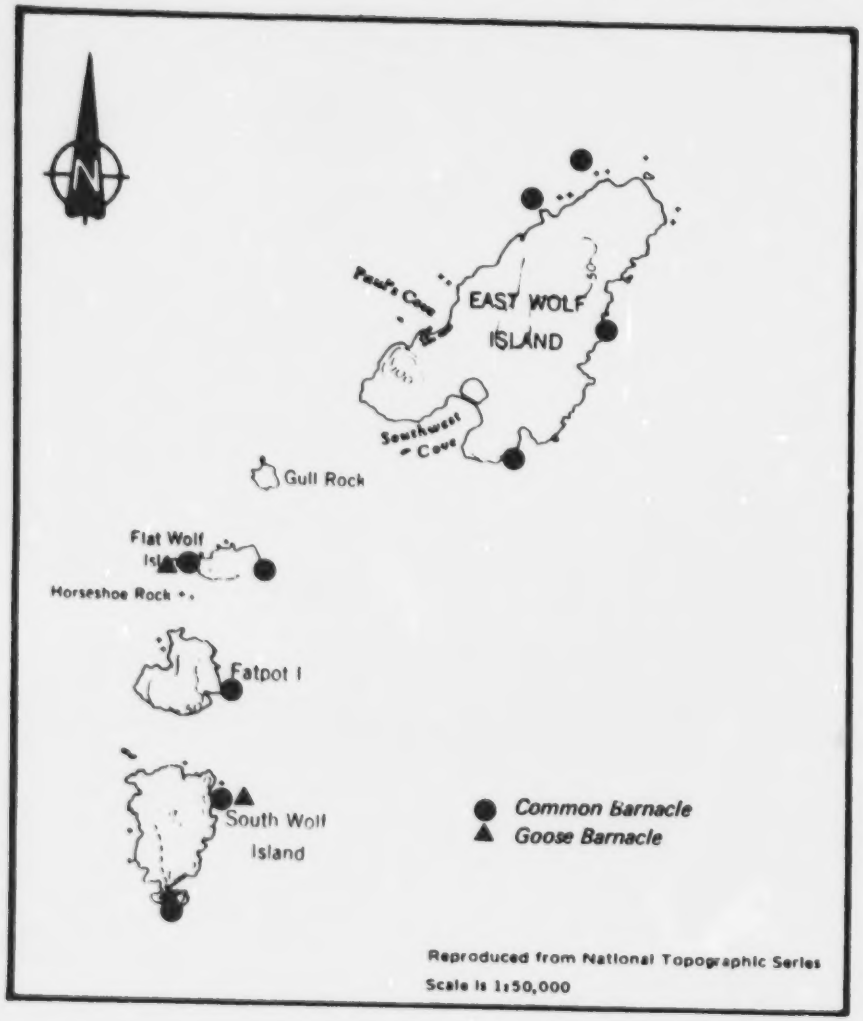
7.14.2
DISTRIBUTION OF AMERICAN LOBSTER

THE WOLVES ISLANDS



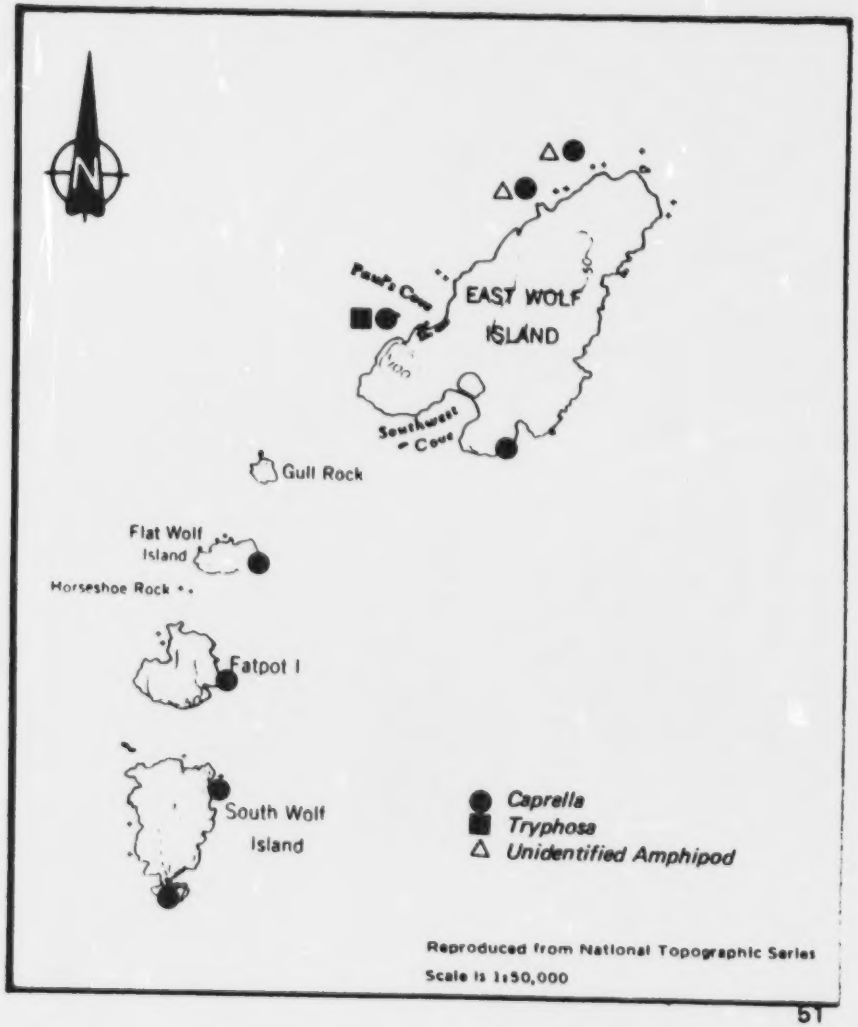
7.14.3
DISTRIBUTION OF BARNACLES

THE WOLVES ISLANDS



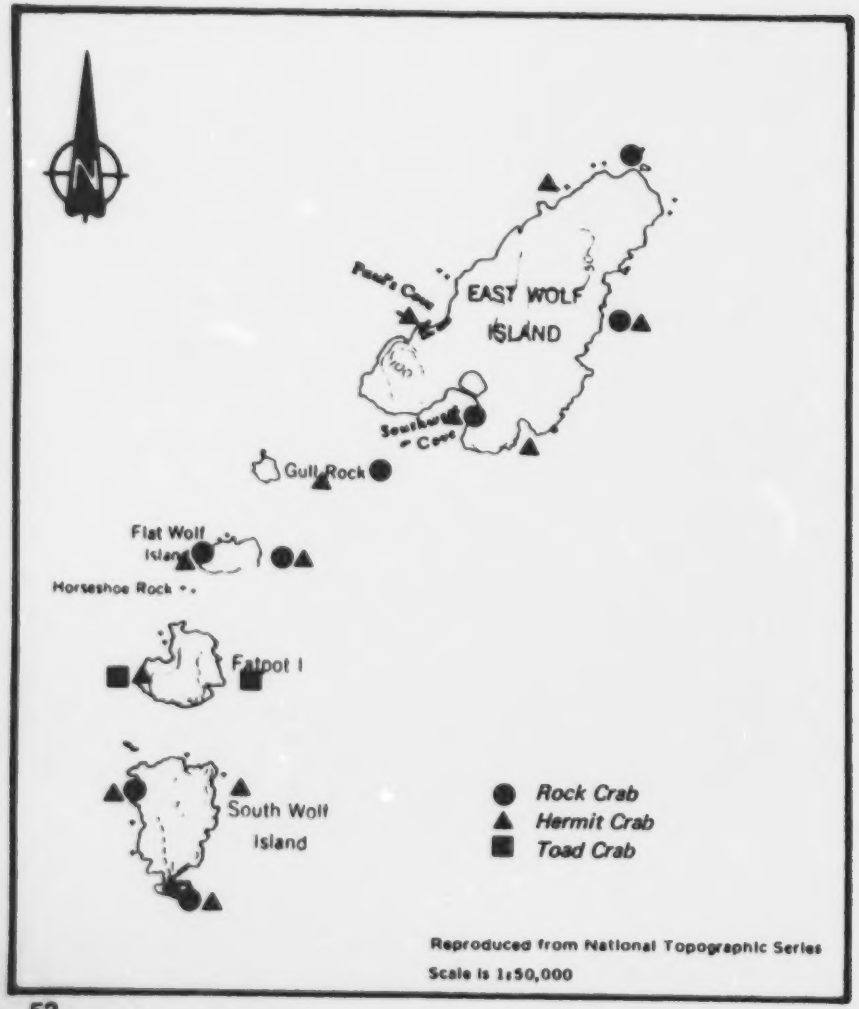
7.14.4
DISTRIBUTION OF CAPRELLIDS AND AMPHIPODS

THE WOLVES ISLANDS



7.14.5
DISTRIBUTION OF CRABS

THE WOLVES ISLANDS



ECHINODERMATA

(STARFISH, URCHINS, ETC.)

7.15 INTRODUCTION

Numerous species of Echinoderms occur in the Bay of Fundy. Some species occur intertidally but most are subtidal. At the Wolves, all major species were represented on a variety of substrates.

Sea urchins are the only species in this group with commercial value but due to the rugged shoreline in the study area, this species would be difficult to harvest using conventional dragging methods. Potential also exists for pharmaceutical utilization of chemicals extracted from certain species.

7.16 ANNOTATED LIST OF SPECIES

7.16.1 SCARLET PSOLUS/*Psolus fabricii* (Duben and Koren)

Description - Dorsal sides covered with scales; ten tentacles on anterior end; large sole with tube feet for attachment to rock; bright red, sometimes darkened by mud.

Habitat - Occurs subtidally on rock from low water to 50 feet.

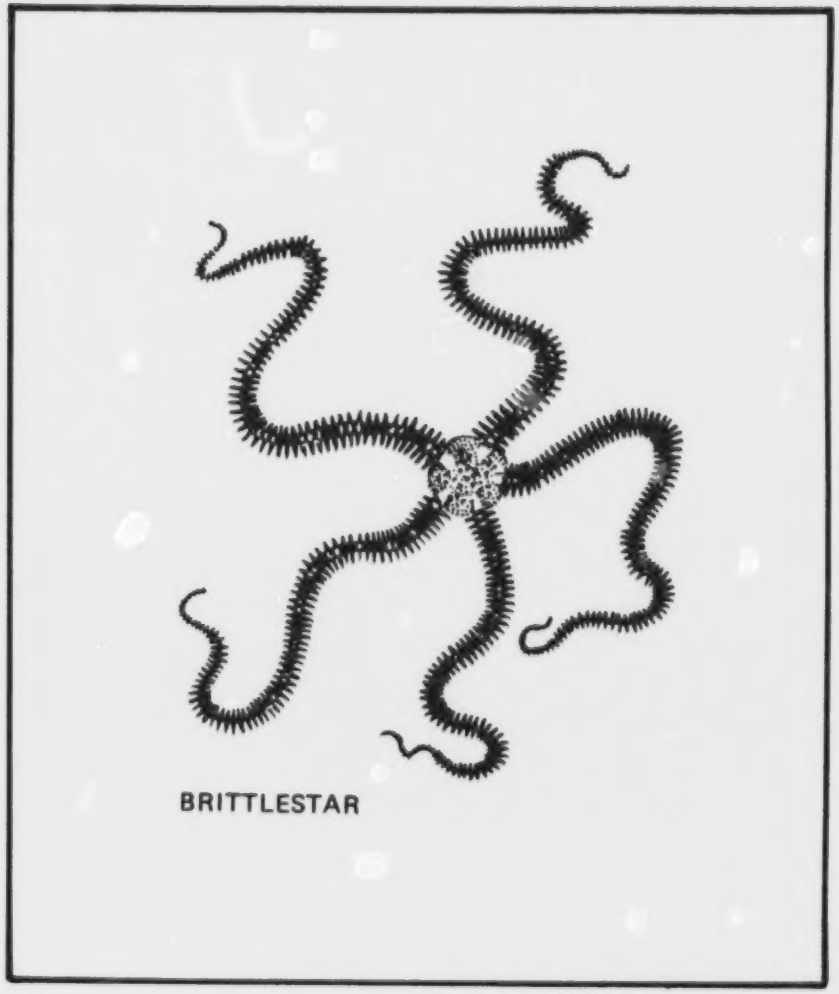
Distribution and Abundance (Figure 7.16.1) - T2-P, 4-P.

7.16.2 NORTHERN SEA CUCUMBER/*Cucumaria frondosa* (Gunnerus)

Description - Cylindrical body with tube feet in five longitudinal lines; ten branching tentacles on anterior end; to 12 inches in length - black, grey, occasionally yellow or orange.

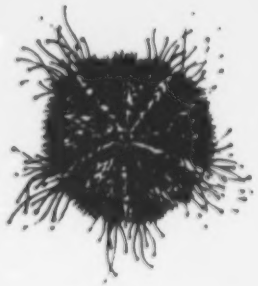
Habitat - Occurs subtidally on various substrates from 10 feet to depths in excess of 100 feet.

Distribution and Abundance (Figure 7.16.1) - 5-P, 12-C .



BRITTLESTAR

7.16.3 SEA URCHINS/*Strongylocentrotus droebachiensis* (Muller)



Description - Circular with many sharp spines; to 4 inches in diameter; green.

Habitat - Occurs intertidally in tide pools and near the low water mark. Subtidally from low water to 50 feet and more, but most abundant to 20 feet. Occurs on various substrates.

Commercial Utilization - Good markets exist for sea urchins roe and development of this fishery is beginning in New Brunswick. Development of harvesting techniques are required to obtain economical returns from the study area where, although abundant, urchins occur on difficult bottom for harvesting.

Distribution and Abundance (Figure 7.16.2) - T1-P to C, T2-C to A, 1-P to C, 2-C, 3-C, 4-C, 5-P to C, 7-C, 8-P to A, 9-P to A, 10-C to A, 12-A, 13-A, 14-A.

7.16.4 SAND DOLLARS/*Echinarachnius parma* (Lamark)

Description - Flat; circular; five petal-shaped rays on upper side; to 4 inches; dark brown to black.

Habitat - Occurs intertidally and subtidally on sand bottom to depths of 20 feet.

Distribution and Abundance (Figure 7.16.4) - 11-P.

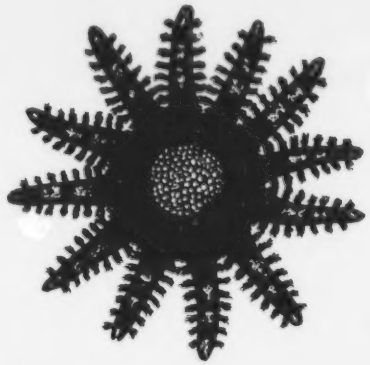
7.16.5 PURPLE SUNSTAR/*Solaster endeca* (Linnaeus)

Description - Most commonly has 9 to 10 arms; to 16 inches in diameter; purple, yellow, orange.

Habitat - Occurs subtidally on various substrates from low water to 50 feet.

Distribution and Abundance (Figure 7.16.5) - T1-P, 4-P, 10-P.

7.16.6 SPINY SUNSTAR/*Crossaster papposus* (Linnaeus)



Description - Usually 10-12 arms; bristle-like spines cover dorsal side; to 12 inches in diameter; usually red with white alternating bands; sometimes dark purple.

Habitat - Occurs subtidally from low water to depths in excess of 100 feet on various substrates.

Distribution and Abundance (Figure 7.16.5) - 10-P.

7.16.7 BLOODSTAR/*Henricia sp.*

Description - Five rayed; arms rounded; smooth; to 6 inches; red, orange, yellow.

Habitat - Occurs near low water intertidally and subtidally to depths in excess of 100 feet on rocky substrate.

Distribution and Abundance (Figure 7.16.5) - T1-P, T2-C, 1-P, 2-P to C, 3-P, 4-P, 7-P, 8-P, 9-P, 10-P to C, 11-C, 12-P, 13-P.

7.16.8 COMMON STARFISH/*Asterias vulgaris* (Verrill)

Description - Five rayed; moderately spiny; rarely to 20 inches;orange, yellow.

Habitat - Occurs intertidally near low water and subtidally to 50 feet on various substrates.

Distribution and Abundance (Figure 7.16.5) - T1-P to C, T2-P, 1-P, 2-P, 4-P, 5-P, 7-P, 8-P, 10-C, 11-P, 12-P, 13-P, 14-P.

7.16.9 BRITTLESTAR/*Ophiopholis aculeata* (Linnaeus)

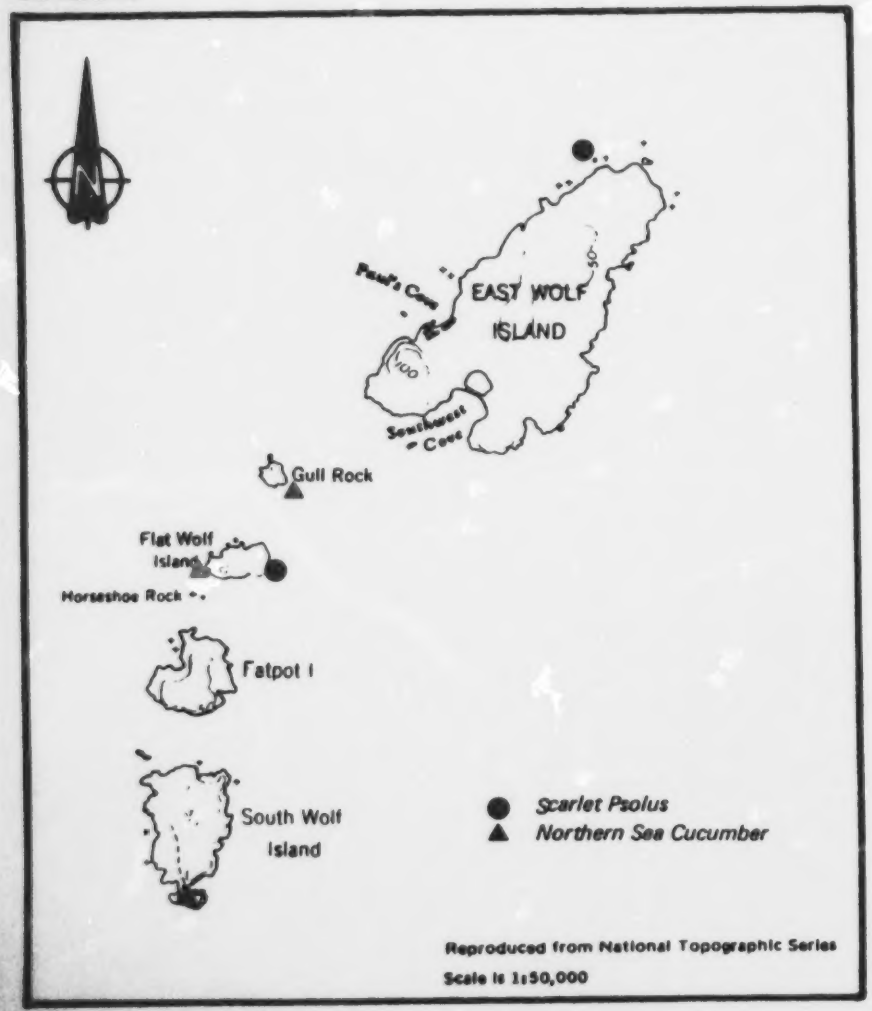
Description - Five delicate rays emerging from a circular disc; to 6 inches in diameter; various combinations of dark red and white.

Habitat - Occurs intertidally in tide pools and near low water. Subtidally under rocks and in ledge to depths in excess of 100 ft.

Distribution and Abundance (Figure 7.16.3) - T2-A, 1-P, 2-P, 3-C, 4-P, 7-P, 12-C, 13-C, 14-C.

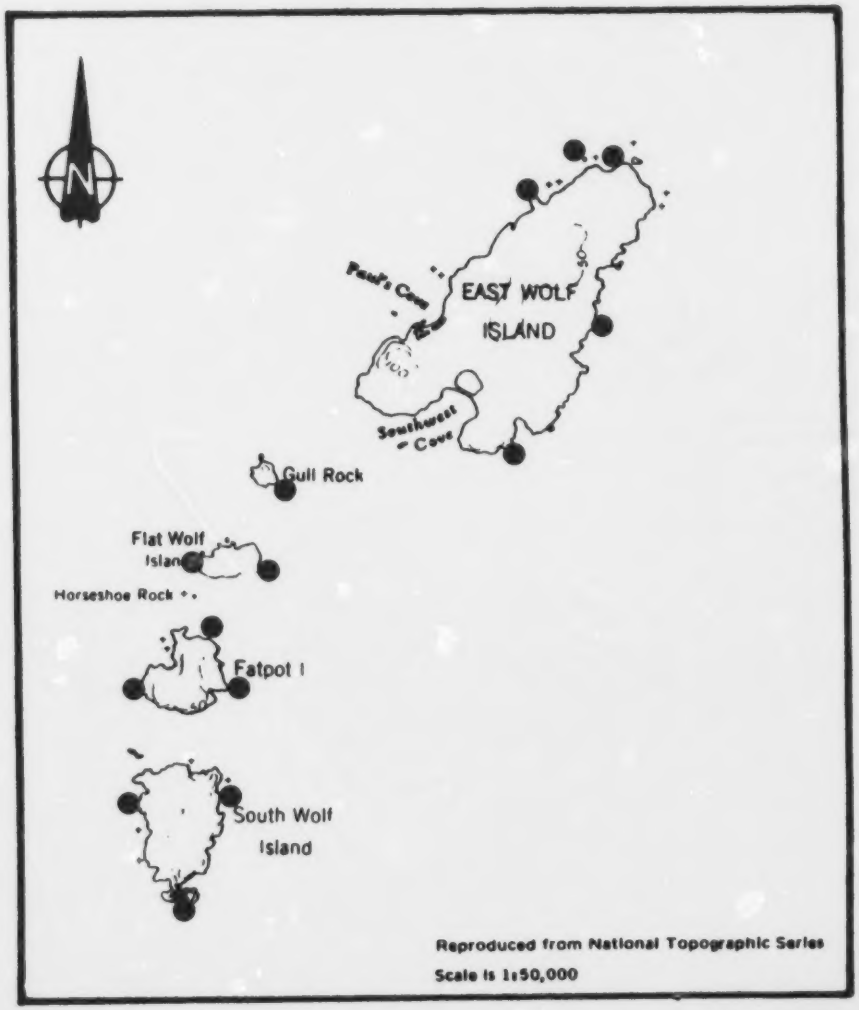
7.16.1
DISTRIBUTION OF SEA CUCUMBERS

THE WOLVES ISLANDS



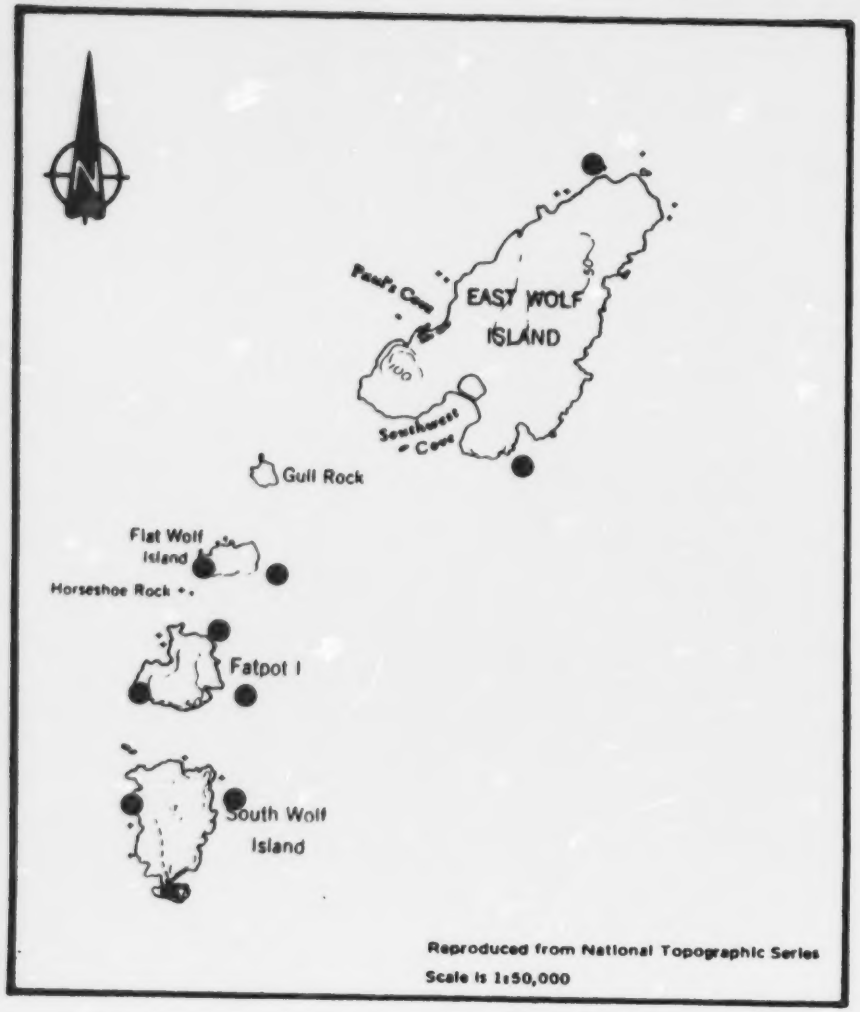
7.16.2
DISTRIBUTION OF SEA URCHINS

THE WOLVES ISLANDS



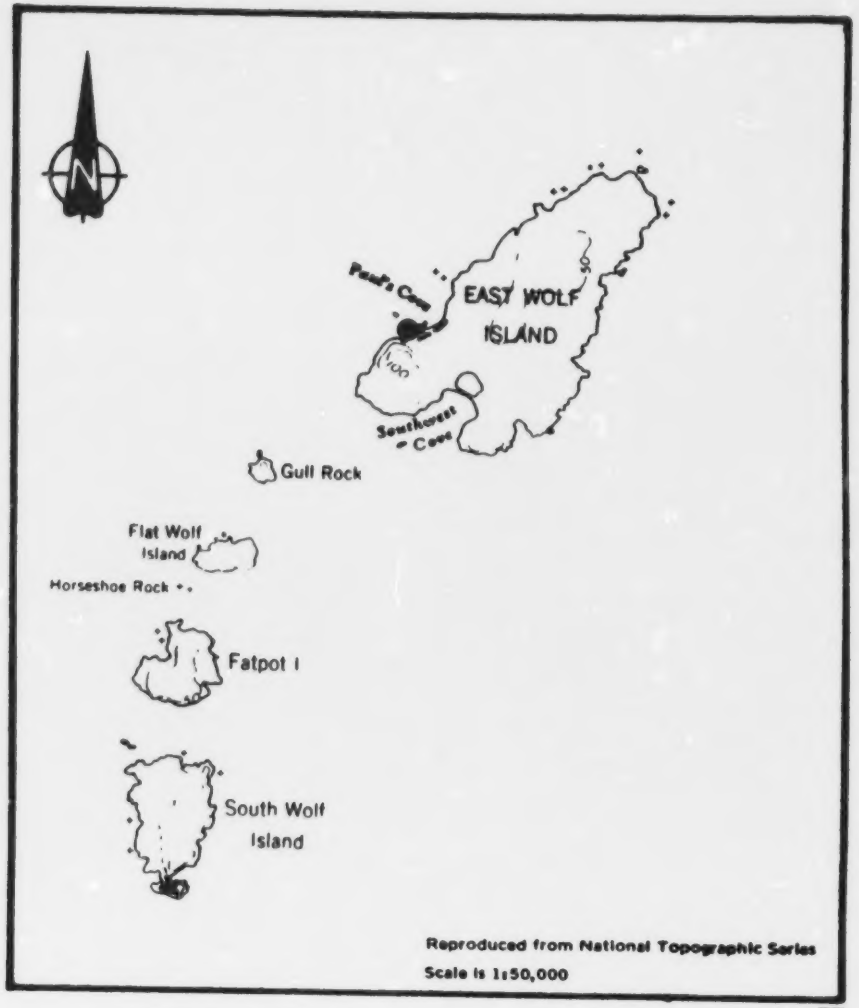
7.16.3
DISTRIBUTION OF BRITTLE STARS

THE WOLVES ISLANDS



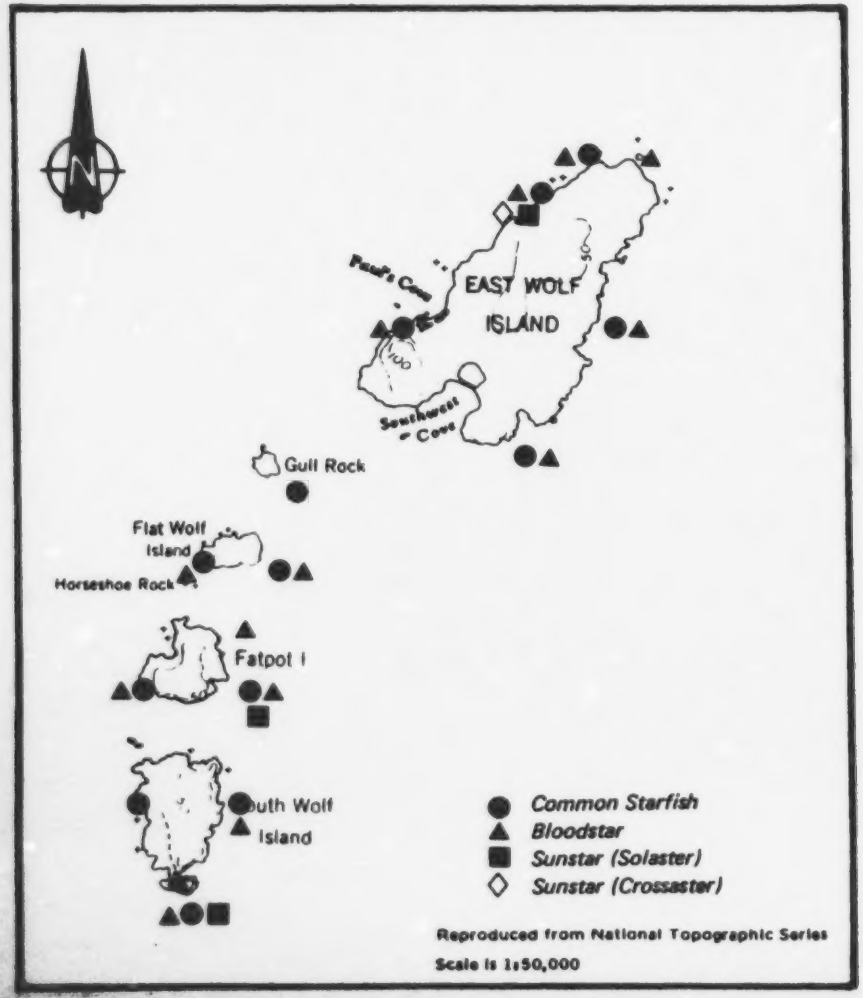
7.16.4
DISTRIBUTION OF SAND DOLLARS

THE WOLVES ISLANDS



7.16.5
DISTRIBUTION OF STARFISH

THE WOLVES ISLANDS



PROTOCHORDATA
(SEA SQUIRTS, ACORN WORMS, ETC.)

7.17 INTRODUCTION

A limited number of species of protochordates occur in the Bay of Fundy. With the exception of the Acorn worm which occurs in mud flats, and a few sea squirts that occur under rocks in tide pools, protochordata are found subtidally on rock, mud or twine. At the Wolves three species were recorded, all subtidally. They were a common component of the local fauna.

While potential exists for the pharmaceutical utilization of chemicals extracted from certain species, the only commercial use at the present time is as a research animal.

7.18 ANNOTATED LIST OF SPECIES

7.18.1 SEA POTATO/*Boltenia ovifera* (Linnaeus)

Description - Egg-shaped body on slender stalk to 18 inches; openings on body for filter feeding; orange-red; often encrusted with Bryozoa and other tunicates.

Habitat - Occurs subtidally from low water to well over 100 feet; on rock; also common on weir posts, shells of scallops and horse mussels.

Distribution and Abundance (Figure 7.18.1) - T1-P, T2-C, 1-P, 2-C to A, 3-C, 4-P to C, 5-P, 7-P to C, 8-P, 10-P, 12-P, 13-P, 14-P.

7.18.2 *Boltenia echinata* (Linnaeus)

Description - Cactus-like tubercles covering unstalked body; to 1 inch diameter; pink-red.

Habitat - Occurs subtidally under rocks, on other tunicates and on shells; from low water to over 100 feet.

Distribution and Abundance (Figure 7.18.1) - 3-C.

7.18.3 SEA PEACH/*Halocynthia pyriformis* (Rothke)

Description - Barrel-shaped; to 4 inches; two apertures on top; orange, white.

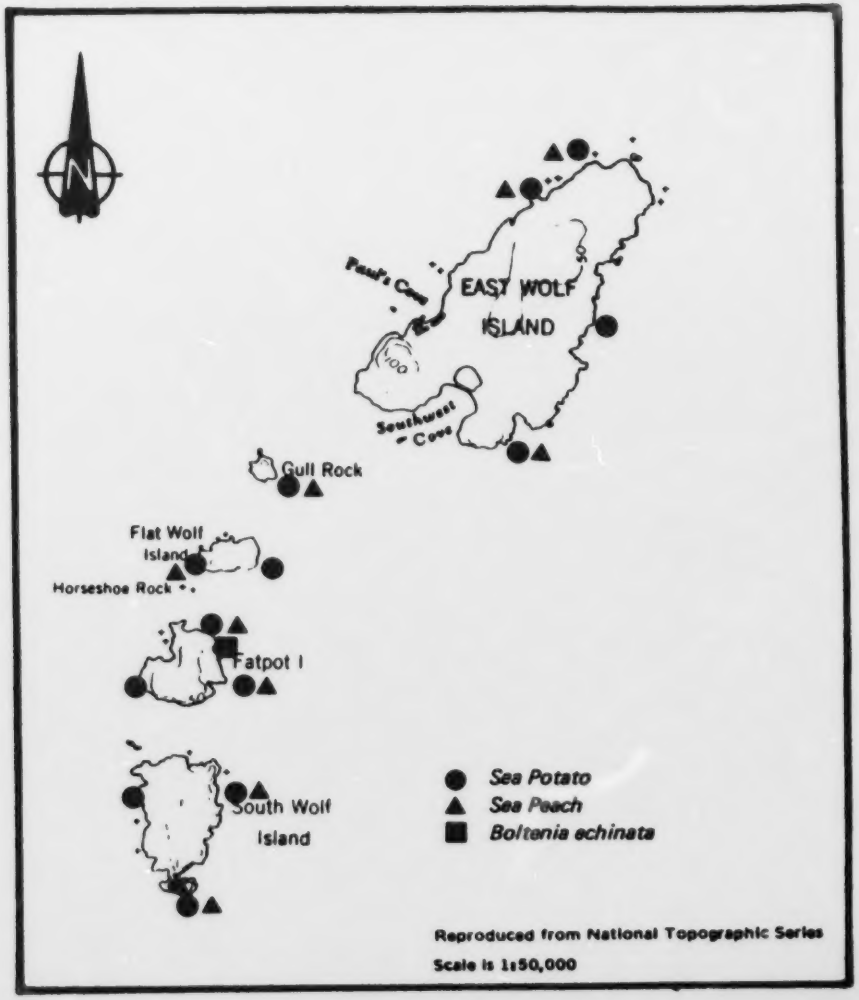
Habitat - Occurs attached to the upper surface of rocks, ledge, shells etc. from low water to depths in excess of 100 feet.

Commercial Utilization - Used as research animal by cancer researchers.

Distribution and Abundance (Figure 7.18.1) - T1-P, T2-P, 1-P, 2-P, 3-C, 5-P, 7-P, 10-P, 12-P.

7.18.1
DISTRIBUTION OF SEA SQUIRTS

THE WOLVES ISLANDS



7.19 INTRODUCTION

Principal Commercial activities in the area revolve around the fishery (See Section 9). During the course of this survey, site records were kept for all fish species encountered. Other species which occur in the area but were not recorded, are given in Table 7.19.1.

7.20 ANNOTATED LIST OF SPECIES

7.20.1 ATLANTIC COD/*Gadus morhua* Linnaeus

Description - Weight-average 5 pounds; average maximum not over 60 lbs; recorded over 200 lbs. The common Fundy Cod. See Leim and Scott (1966) for detailed description.

Habitat - Common in deep water throughout the area . Taken in local weirs.

Commercial Utilization - See Section 9

Site Records (Figure 7.20.1) - 6-C.

7.20.2 CUNNER/*Tautogolabrus adspersus* (Walbaum)

Description - A perch-like fish reaching 12 inches, with a maximum size of about 17 inches and weight of 3¼ pounds See Leim and Scott (1966) for detailed description.

Habitat - In some areas such as Newfoundland, this species occurs abundantly around wharves and underwater structures. In the Bay of Fundy we have only observed the Cunner around submerged ledges.

Site Records (Figure 7.20.1) - 13-P.

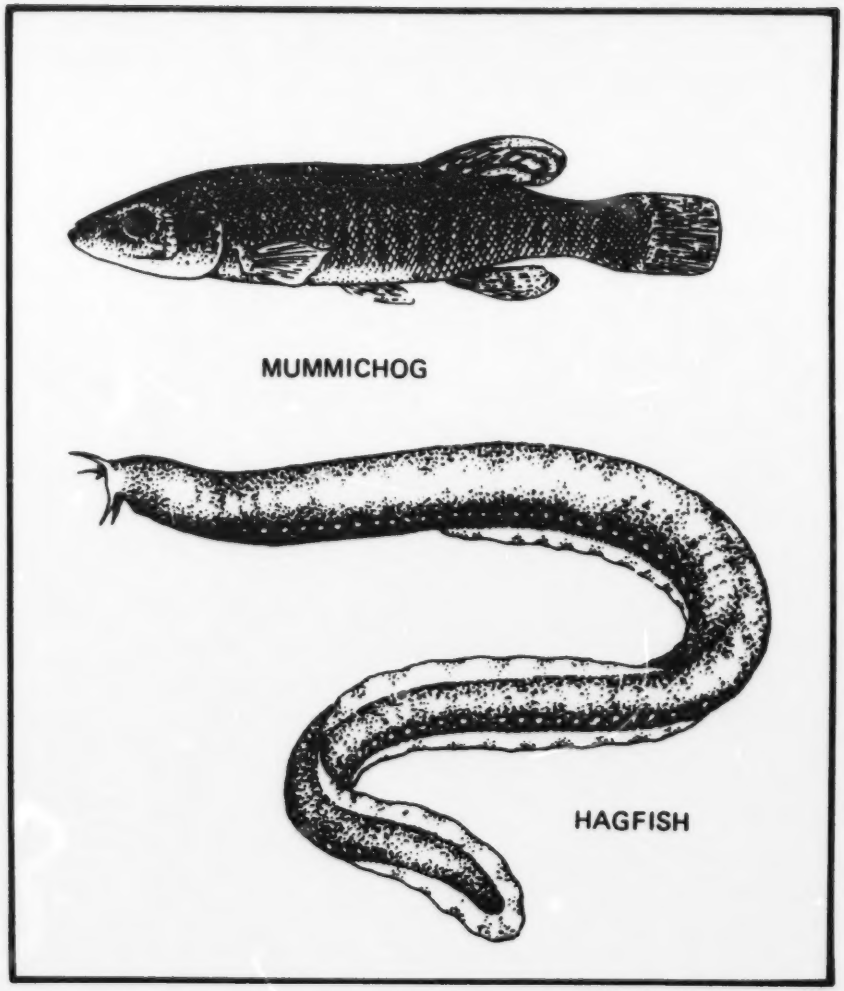
7.20.3 WINTER FLOUNDER/*Pseudopleuronectes americanus* (Walbaum)

Description - A small flounder seldom exceeding 18 inches. See Leim and Scott (1966) for detailed description

Habitat - This species occurs in bays and inlets and offshore. It was sighted in normal flounder habitat at the Wolves.

Commercial Utilization - A common commercial species. See Section 9.

Site Records (Figure 7.20.1) 7-P, 9-P, 11-P, 13-P, 14-P



7.20.4 ANGLER, MONKFISH OR GOOSEFISH/*Lophius americanus* Valenciennes

Description - A grotesque fish with large flattened head and small tail. Captures prey with a fleshy "lure" located at the tip of a "rod" attached above the mouth. Reaches 4 feet in length and 50-60 pounds. See Leim and Scott (1966) for detailed description.

Habitat - Most frequently observed lying on mud or sand bottom.

Site Records (Figure 7.20.1) - 6-P.

7.20.5 HARBOUR POLLACK/*Pollachius virens* (Linnaeus)

Description - The young of Pollack, locally called "Harbour Pollack, resemble the adults which reach 42 inches in length and a maximum weight of 60-70 pounds. See Leim and Scott (1966) for detailed description.
Habitat - As young, pollack occur in abundance around wharves, weirs and ledges.

Site Records (Figure 7.20.2) - 3-A.

7.20.6 LUMPFISH/*Cyclopterus lumpus* Linnaeus

Description - A "boxy" fish with well developed jaws; pectoral fins modified as a sucking disc. Color ranges from blue, bluish-grey, green and brown; breeding males are red. See Leim and Scott (1966) for detailed description.

Habitat - Commonly found around weirs and ledges. Often seen brooding their eggs during spring and summer.

Site Records (Figure 7.20.2) - T1-C, 7-P.

7.20.7 MACKEREL/*Scomber scombus* Linnaeus

Description - A small streamlined member of the tuna family. Reaches 22 inches and a weight of 4 pounds. See Leim and Scott (1966) for detailed description.

Habitat - A pelagic species which occurs in large schools during the summer. Common at the Wolves; often taken in weirs.

Commercial Utilization - See Section 9.

Site Records (Figure 7.20.2) - 6-A

7.20.8 HAGFISH/*Myxine glutinosa* Linnaeus

Description - A grey eel-shaped fish, lacking eyes. See Leim and Scott (1966) for detailed description.

Habitat - Normally found at great depth. While rarely seen in shallow water, a single animal was observed by an MRA diver in about 30 feet of water.

Site Records (Figure 7.20.2) - Probably common in surrounding waters. 11-P.

7.20.9 BLENNY OR ROCK GUNNEL/*Pholis gunnellus* (Linnaeus)

Description - A small eel-like fish reaching 12 inches maximum length. See Leim and Scott (1966) for detailed description.

Habitat - Common intertidally and subtidally in rock rubble.

Site Records (Figure 7.20.3) - T2-P, 14-P.

7.20.10 SCULPINS/ *Myoxocephalus octodecemspinosus*
M. scorpius (Mitchill)

Description - Typical sculpins; large head, small tail, prominent fins, spines. See Leim and Scott (1966) for detailed description.

Habitat - Usually seen on mud and sand bottom.

Site Records (Figure 7.20.3) - T1-P.

7.20.11 SEA RAVEN/*Hemitripterus americanus* (Gmelin)

Description - A highly ornamented sculpin. See Leim and Scott (1966) for detailed description.

Habitat - Seen on most bottom types; frequently on ledges.

Site Records (Figure 7.20.3) - 12-P.

7.20.12 SKATES

Description - No species designation was made. Typically flattened with large "wings" and prominent slender tail.

Habitat - Usually seen on mud or sand.

Site Records (Figure 7.20.3) 12-P.

7.20.13 OCEAN POUT/*Macrozoarces americanus*

Description - A large eel-like fish reaching 3½ feet and a weight of 12 pounds. See Leim and Scott (1966) for detailed description.

Habitat - Commonly taken at the Wolves from deep water. Occasionally seen in shallow water on all bottom types.

Site Records (Figure 7.20.3) - 10-P.

TABLE 7.19.1 FISHES RECORDED IN THE STUDY AREA AND VICINITY

MARSIPOBRANCHII

Myxine glutinosa (Hagfish)
Petromyzon marinus (Lamprey)

SELACHII

Carcharias taurus (Sand Shark)*
Alopias vulpinus (Thresher Shark)*
Carcharodon carcharias (White Shark)
Lamna nasus (Porbeagle)
Mustelus canis (Smooth Dogfish)*
Rhizoprionodon terraenovae (Atlantic Sharpnose Shark)*
Somniosus microcephalus (Greenland Shark)
Squalus acanthus (Spiny Dogfish)
Raja erinacea (Little Skate)
R. laevis (Barndoor Skate)
R. ocellata (Winter Skate)
R. radiata (Thorny Skate)
Torpedo nobiliana (Atlantic Torpedo)

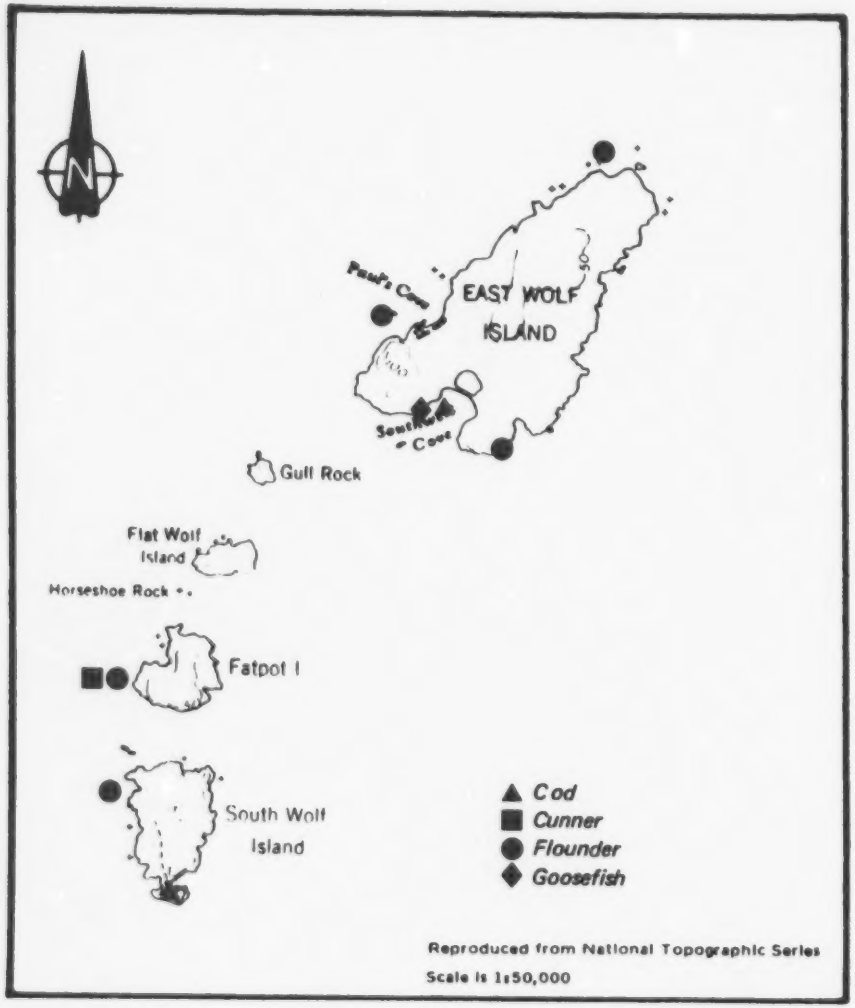
PISCES

Acipenser oxyrhynchus (Atlantic Sturgeon)
Alosa pseudoharengus (Alewife)
A. sapidissima (American Shad)
Brevoortia tyrannus (Menhaden)*
Clupea harengus (Herring)
Etrumeus sadina (Round Herring)*
Coregonus clupeaformis (Lake Whitefish)*
Salmo salar (Atlantic Salmon)
Salvelinus fontinalis (Brook Trout)
Mallotus villosus (Capelin)*
Osmerus mordax (Smelt)
Mauroclicus muelleri (Muller's Pearlsides)*
Anguilla rostrata (American Eel)
Conger oceanicus (Conger Eel-larval)*
Scomberesox saurus (Atlantic Saury)*
Hyporhamphus sp. (Common Halfbeak)*
Fundulus heteroclitus (Mummichog)
Syngnathus fuscus (Northern Pipefish)
Apeltes quadracus (Fourspine Stickleback)
Gasterosteus aculeatus (Threespine Stickleback)
G. wheatlandi (Blackspotted Stickleback)
Pungitius pungitius (Ninespine Stickleback)
Brosme brosme (Cusk)
Enchelyopus cimbrius (Fourbeard rockling)
Gadus morhua (Atlantic Cod)
Melanogrammus aeglefinus (Haddock)
Merluccius bilinearis (Silver Hake)
Microgaddus tomcod (Atlantic Tomcod)
Pollachius virens (Pollock)
Urophycis chuss (Squirrel Hake)
Nezumia bairdi (Marlin Spike)*
Zenopsis ocellata (American John Dory)*
Roccus americanus (White Perch)
R. saxatilis (Striped Bass)
Stenotomus chrysops (Scup)*
Tautoga onitis (Tautog)*
Tautogolabrus adspersus (Cunner)
Ammodytes americanus (American Sand Lance)
Sarda sarda (Atlantic Bonito)*
Scomber colias (Chub Mackerel)
S. scombrus (Atlantic Mackerel)
Thunnus thynnus (Bluefin Tuna)
Anarhichas lupus (Atlantic Wolffish)
A. minor (Spotted Wolffish)*
Pholis gunnellus (Rock Gunnell)
Cryptacanthodes maculatus (Wrymouth)
Lumpenus lumpretaeformis (Snake Blenny)
Ulvaria subbifurcata (Radiated Shanny)
Lycenchelys verrilli (Wolf Eelpout)*
Macrozoarces americanus (Ocean pout)
Poronotus triacanthus (Butterfish)
Menidia menidia (Atlantic Silverside)
Sebastes marinus (Redfish)
Prionotus carolinus (Northern Searobin)
P. evolans (Striped Searobin)*
Artediellus uncinatus (Arctic Hookear Sculpin)*
Gymnocanthus tricuspis (Arctic Staghorn Sculpin)*
Hemitripterus americanus (Atlantic Sea Raven)
Myoxocephalus octodecemspinosus (Longhorn Sculpin)
M. scorpius (Shorthorn Sculpin)
Triglops murrayi (Mailed Sculpin)*
Aspidophoroides monopterygius (Alligatorfish)*
Cyclopterus lumpus (Lumpfish)
Eumicrotremus spinosus (Atlantic Spiny Lumpfish)*
Liparis atlanticus (Atlantic Seasnail)
L. liparis (Striped Seasnail)
Paralichthys dentatus (Summer Flounder)*
P. oblongus (Fourspot Flounder)*
Scophthalmus aquosus (Windowpane)
Glyptocephalus cynoglossus (Witch Flounder)
Hippoglossoides platessoides (American Plaice)
H. hippoglossus (Atlantic Halibut)
Liopsetta putnami (Smooth Flounder)
Pseudopleuronectes americanus (Winter Flounder)
Monacanthus hispidus (Planehead Tilefish)*
Mola mola (Ocean Sunfish)*
Lophius americanus (Monkfish)

* RARE OR OCCASIONAL OCCURRENCE.

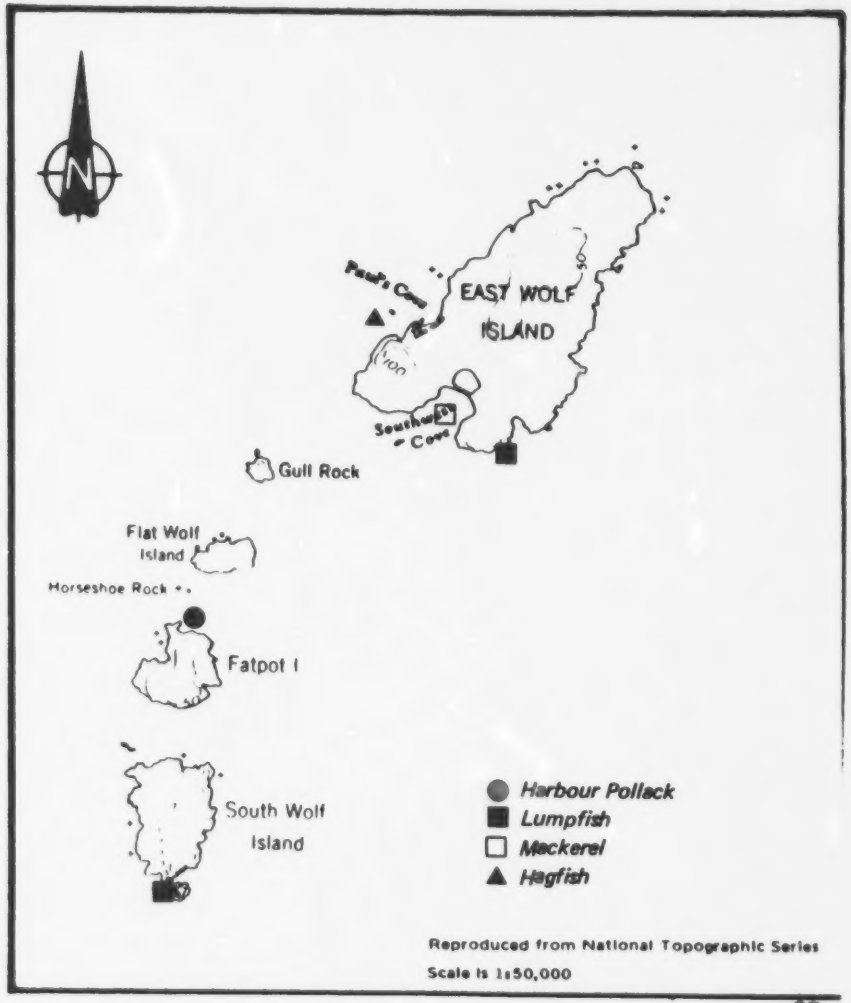
7.20.1
DISTRIBUTION OF COD, CUNNER, FLOUNDER AND GOOSEFISH

THE WOLVES ISLANDS



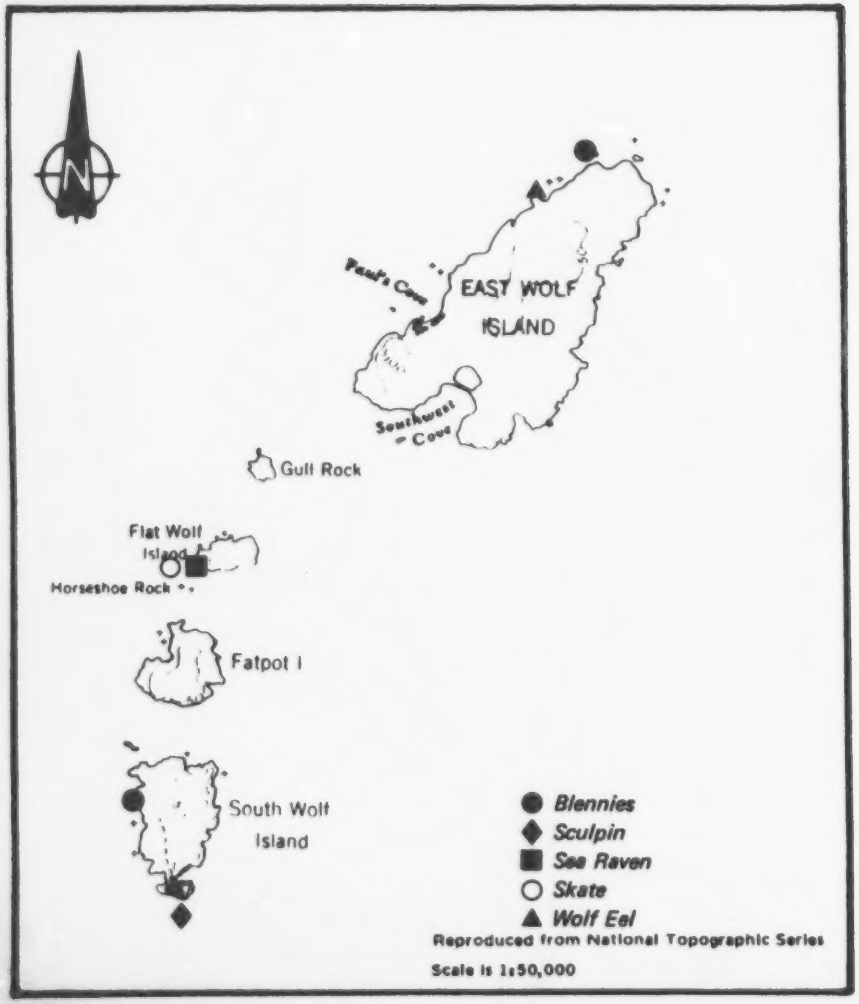
7.20.2
DISTRIBUTION OF HARBOUR POLLACK, LUMPFISH, MACKEREL AND HAGFISH

THE WOLVES ISLANDS



7.20.3
DISTRIBUTION OF BLENNIES, SCULPIN, SEA RAVEN, SKATE AND WOLF EEL

THE WOLVES ISLANDS



7.21 INTRODUCTION

Because of their offshore location, both inshore and pelagic species of birds can be found at the Wolves. During the course of this study, site records were kept for all species observed. Other species which have been recorded in the area are listed in Table 7.21.7.

7.22 ANNOTATED LIST OF SPECIES

7.22.1 DOUBLE-CRESTED CORMORANT/*Phalacrocorax auritus* (Lesson)

General - While not abundant during the field survey, this species is common at the Wolves and probably breeds there.

Site Records (Figure 7.22.1) - 1-one, 2-one.

7.22.2 BLACK GUILLEMOT/*Cepphus grylle* (Linnaeus)

General - A common species in the Bay of Fundy, this species breeds at the Wolves.

Site Records (Figure 7.22.2) - T1-P, T2-P, 1-C, 2-C, 5-P.

7.22.3 COMMON EIDER/*Somateria mollissima* (Linnaeus)

General - A common Bay of Fundy duck, this species is abundant at the Wolves. It probably breeds there.

Site Records (Figure 7.22.3) - T1-9, 1-C, 4-12, 5-3, 10-86.

7.22.4 HERRING GULL/*Larus argentatus* Pontoppidan

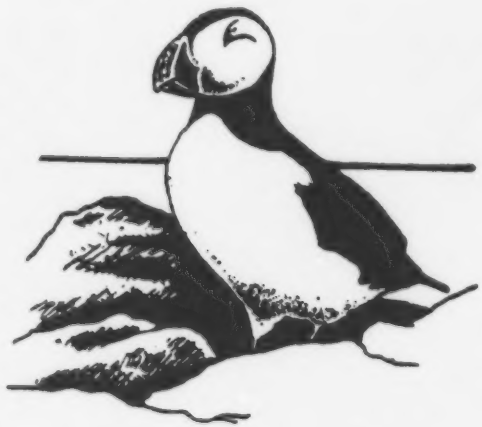
General - The Herring Gull is abundant at the Wolves. It breeds there in substantial numbers and in some areas trees have been killed.

Site Records (Figure 7.22.4) - T1-C, 1-A, 2-A, 4-C, 5-A, 7-P, 13-A.

7.22.5 GREAT BLACK-BACKED GULL/*Larus marinus* Linnaeus

General - The Black-backed Gull is common at the Wolves where it breeds.

Site Records (Figure 7.22.5) - 1-A, 2-A, 4-C, 5-A.



PUFFIN

7.22.6 TERNS/*Sterna hirundo*
S. paradisaea Pontoppidon

General - Both Common and Arctic Terns occur in the area. Terns are common at the Wolves.

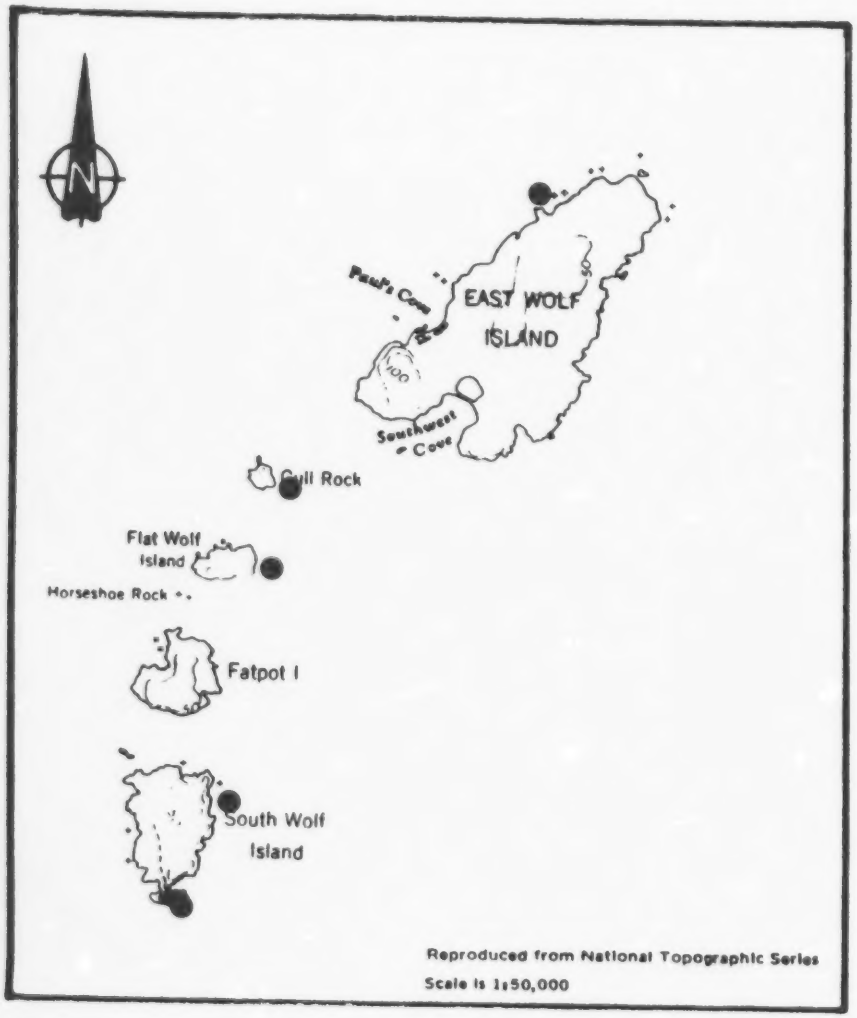
Site Records (Figure 7.22.4) - T1-P.

TABLE 7.21.7 MARINE BIRDS OCCURRING IN THE STUDY AREA AND VICINITY.

Gavia immer immer (Common Loon)	Porzana carolina (Sora)
Gavia stellata (Red-throated Loon)	Charadrius melodus (Piping Plover)
Colymbus grisegena holboelli (Holboell's Grebe)	Charadrius semipalmatus (Semipalmated Plover)
Colymbus auritus (Horned Grebe)	Oxyechus vociferus vociferus (Killdeer)
Podilymbus podiceps podiceps (Pied-billed Grebe)	Pluvialis dominica dominica (American Golden Plover)
Thalassogeron chlororhynchos (Yellow-nosed Albatross)	Squatarola squalarola (Black-bellied Plover)
Puffinus griseus (Sotty Shearwater)	Arenaria interpres morinella (Ruddy Turnstone)
Puffinus gravis (Greater Shearwater)	Actitis (Spotted Sandpiper)
Fulmarus glacialis (Atlantic Fulmar)	Totanus melanoleucus (Greater Yellow-legs)
Oceanodroma leucorhoa (Leach's Petrel)	Totanus flavipes (Lesser Yellow-legs)
Oceanites oceanicus (Wilson' Petrel)	Arquatella maritima (Purple Sandpiper)
Moris bassana (Gannet)	Pisobia melanotos (Pectoral Sandpiper)
Phalacrocorax carbo carbo (European Cormorant)	Pisobia fuscicollis (White-rumped Sandpiper)
Phalacrocorax auritus auritus (Double-crested Cormorant)	Pisobia minutilla (Least Sandpiper)
Ardea herodias herodias (Great Blue Heron)	Pelidna alpina sakhalina (Red-backed Sandpiper)
Butorides virescens virescens (Eastern Green Heron)	Limnodromus griseus (Dowitcher)
Nycticorax nycticorax hoactli (Black-crowned Night Heron)	Ereunetes pusillus (Semipalmated Sandpiper)
Botaurus lentiginosus (American Bittern)	Crocethia alba (Sanderling)
Ixobrychus exilis (Least Bittern)	Phalaropus fulicarirus (Red Phalarope)
Branta canadensis canadensis (Common Canada Goose)	Lobipes lobatus (Northern Phalarope)
Branta bernicla hrota (American Brant)	Stercorarius parasiticus (Parasitic Jaegar)
Anas platyrhynchos (Mallard)	Larus hyperboreus (Glaucous Gull)
Anas rubripes (Black Duck)	Larus leucopterus (Iceland Gull)
Dafila acuta tzitzihoa (American Pintail)	Larus marinus (Great Black-backed Gull)
Nettion carolinense (Green-winged Teal)	Larus argentatus smithsonianus (Herring Gull)
Querquedula discors (Blue-winged Teal)	Larus philadelphia (Bonaparte's Gull)
Nyroca marila (Greater Scaup Duck)	Rissa tridactyla tridactyla (Atlantic Kittiwake)
Glaucionetta clangula americana (American Golden-eye)	Sterna hirundo hirundo (Common Tern)
Charitonetta albeola (Buffle-head)	Sterna paradisaea (Arctic Tern)
Clangula hyemalis (Old-squaw)	Alca torda (Razor-billed Auk)
Somateria mollissima dresseri (American Eider)	Uria aalge aalge (Atlantic Murre)
Melanitta deglandi (White-winged Scoter)	Uria lomvia lomvia (Brunnich's Murre)
Melanitta perspicillata (Surf Scoter)	Alle alle (Dovekie)
Oidemia americana (American Scoter)	Cepphus grylle grylle (Black Guillemot)
Mergus serrator (Red-breasted Merganser)	Fratercula arctica arctica (Atlantic Puffin)

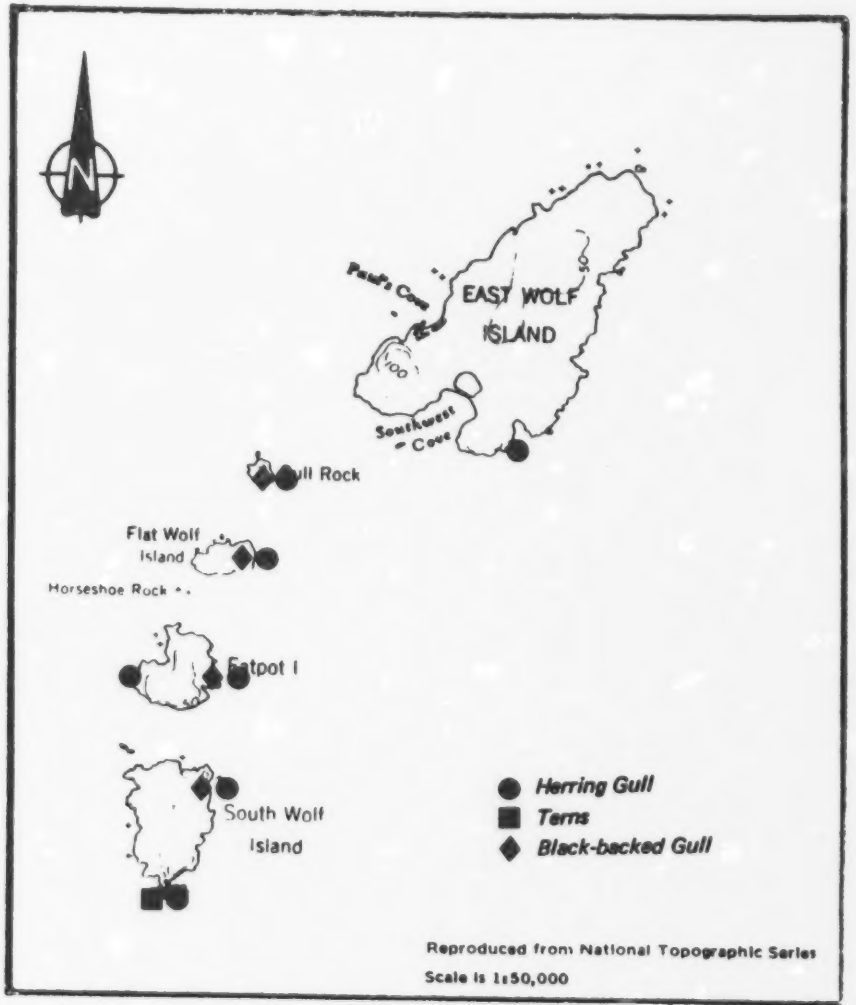
7.22.3
SITE RECORDS FOR COMMON EIDER

THE WOLVES ISLANDS



7.22.4
SITE RECORDS FOR GULLS AND TERNS

THE WOLVES ISLANDS

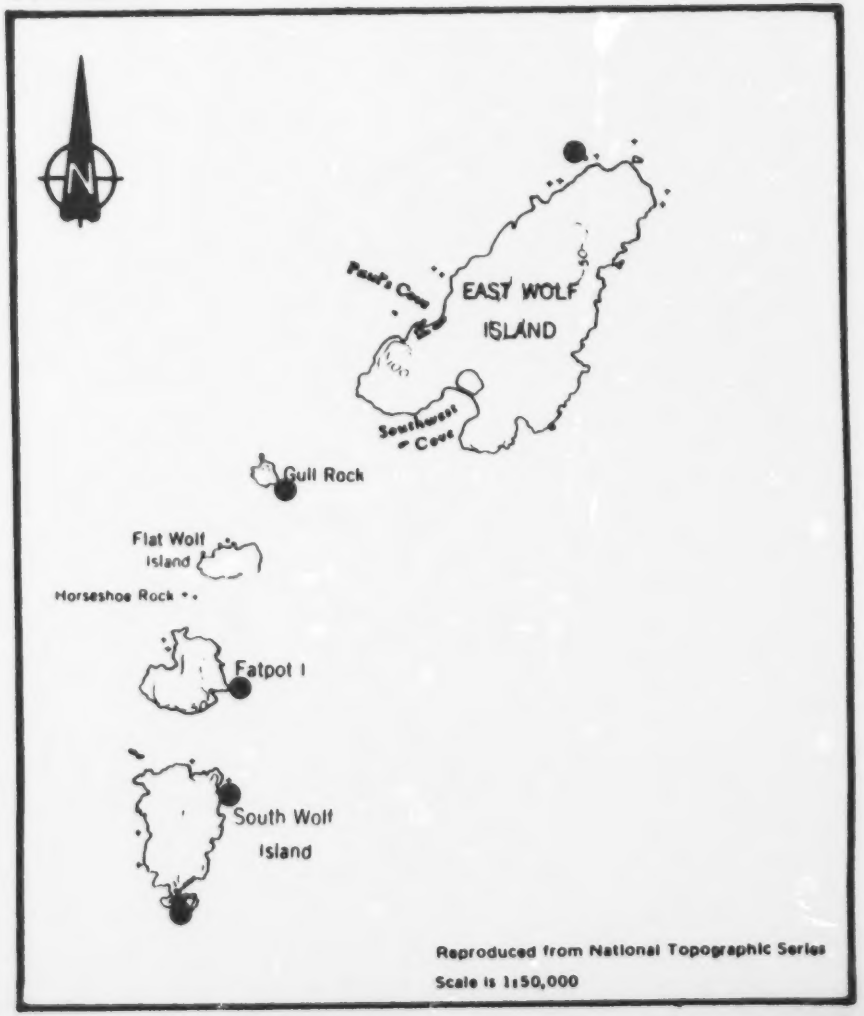


7.22.1
SITE RECORDS FOR CORMORANTS

THE WOLVES ISLANDS

7.22.2
SITE RECORDS FOR BLACK GUILLEMOT

THE WOLVES ISLANDS



MAMMALS
(SEALS, PORPOISE, WHALES)

7.23 INTRODUCTION

Several species of marine mammals have been recorded in the waters surrounding the Wolves. These include: the Harbour Seal, Harbour Porpoise, Minke Whale, Pothead Whale, Finback Whale and Northern Right Whale. Because this area at the mouth of the Bay of Fundy (West Isles, Grand Manan and the Wolves) has a high level of productivity, particularly during the summer and early fall, it supports large populations of the small cetaceans as well as a substantial population of Great Whales; principally Finbacks and Northern Right Whales. Because of the area's importance to these species, it should be considered as a highly valuable Canadian asset. The Northern Right Whale, an endangered species, passes the summer in relative security in the area (a few have been shot) and Gaskin (per. comm., 1978) considers that the area supports, in part, the last major population of Harbour Porpoise in the world.

7.24 ANNOTATED LIST OF SPECIES

7.24.1 NORTHERN RIGHT WHALE/*Eubalaena facialis*

The Northern Right Whale was previously abundant in the North Atlantic, but was reduced to a remnant stock by the beginning of this century. Although it has been protected for several decades it is recovering slowly (Gaskin, 1976). Since 1970, there appears to have been a gradual increase in this species in the area around Grand Manan and the Wolves where it has been sighted every summer for the last few years. MRA researchers have recorded this species at the Wolves.

7.24.2 FINBACK WHALE/*Balaenoptera physalus*

This Great Whale is a common summer resident. Both adults and young spend several months feeding on the krill of the area. They have been recorded in the waters around the Wolves.

7.24.3 MINKE WHALE/*Balaenoptera acutorostrata*

This small whale resembles the Finback Whale. It is a regular summer visitor to the study area.

7.24.4 HARBOUR PORPOISE/*Phocoena phocoena*

The Harbour Porpoise is the most abundant toothed whale. It is a year around resident, but large numbers appear in the area during the summer and fall. Numerous animals have been recorded at the Wolves on virtually every trip made by MRA staff.

HARBOUR SEAL

HARBOUR PORPISE

7.24.5 DOLPHIN/*Lagenorhynchus sp.*

Both White-sided (*L. acutus)* and White-beaked Dolphins occasionally visit the study area.

7.24.6 POTHEAD WHALE/*Globicephala melaena*

The Pothead is a sporadic visitor to the study area. A very large school was reported at the Wolves during the summer of 1977.

7.24.7 HARBOUR SEAL/*Phoca vitulina*

This is the common seal in the study area. Only 3 animals were recorded at the Wolves and the population appeared to be low in 1978.

PLANTS
(SEAWEEDS, ETC.)

7.25 INTRODUCTION

Numerous species of marine plants occur intertidally and subtidally in the Bay of Fundy. They are most abundant and diverse in the intertidal area and in shallow subtidal waters. The majority of species occur on hard substrate but some species (Enteromorpha, Ulva) occur on mudflats. At the Wolves, marine plants are a common component of intertidal and subtidal zones and, due to the rugged nature of the coast, occur almost exclusively on hard substrate.

While the potential exists for commercial utilization of a variety of marine algae (rockweed, Kelp, etc.), harvesting and marketing has yet to be developed. Due to the isolation of these islands and the rugged coastline, harvesting of Dulse on the Wolves is probably uneconomical at the present time.

7.26 ANNOTATED LIST OF SPECIES

7.26.1 IRISH MOSS/*Chondrus crispus* (Stackhouse)

Description - Profusely branched clumps usually less than 3 inches high; dark red, almost black with blue iridescence showing on branches.

Habitat - Common near the low water mark on rocks or ledge, often mixed with dulse.

Commercial utilization - Harvested elsewhere for use in food products and other commercial materials. Irish moss does not occur in large enough quantities in the study area for commercial operations.

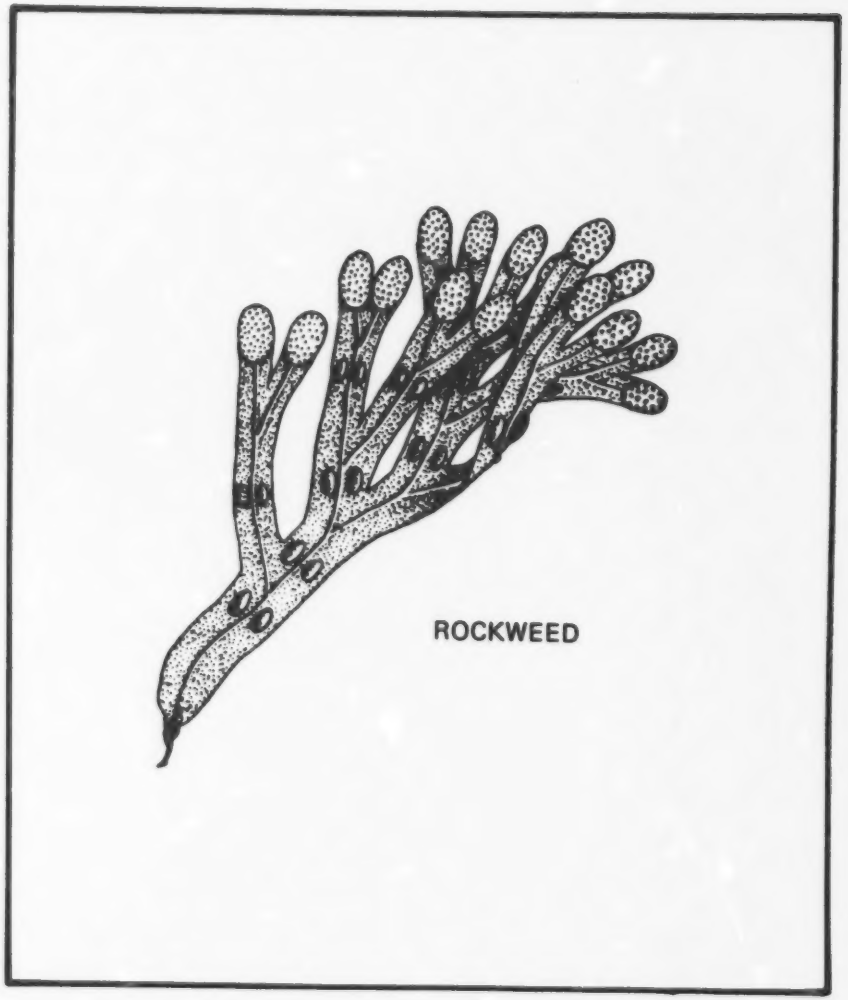
Distribution and Abundance (Figure 7.26.1) - 2-C, 3-C, 4-C, 5-C, 7-C, 8-C, 12-C, 13-C.

7.26.2 CORAL ALGA/*Lithothamnion sp.* (Aresch)

Description - Encrusting, calcareous; occasionally free clumps to 5 inches in diameter; light pink.

Habitat - Occasionally on rocks and shells in tide pools. Abundant from low water to 60 feet on ledge, rocks and shells.

Distribution and Abundance (Figure 7.26.2) - T1-C, T2-A, 1-C, 2-P to C, 3-C, 4-C, 5-C, 7-C, 8-P to C, 9-P, 10-A, 11-P, 12-A, 13-A, 14-A.



ROCKWEED

7.26.3 DULSE/*Rhodymenia palmata* (Greville)

Description - Flat, branching fronds growing from a holdfast; fronds to 18 inches depending on habitat; varying shades of dark red.

Habitat - On rocks, occasionally in tide pools; most common around low water mark and subtidally to 5 feet on rocks and ledge.

Commercial Utilization - Harvested by hand, dried and cleaned, this species is marketed as a food product. It is also ground and sold for use in the food industry.

Distribution and Abundance (Figure 7.26.3) - T2-A, 2-P, 3-C, 4-C, 5-C, 7-P. 8-P, 10-C, 11-P, 12-P, 13-P.

7.26.4 RED ALGA/*Phycodrys rubens* (Batters)

Description - Thin-veined fronds growing from a holdfast; to 5 inches; dark red.

Habitat - Occurs subtidally to thirty feet on rocky substrate.

Distribution and Abundance (Figure 7.26.4) - T1-P, 2-C, 7-P, 10-A, 13-C, 14-C.

7.26.5 RED ALGA/*Polysiphonia lanosa* (Tandy)

Description - Small, multi-branched; to 2 inches; dark reddish-brown.

Habitat - Intertidal, growing on rockweed (*Ascophyllum* only).

Distribution and Abundance (Figure 7.26.5) - T1-A, T2-A, 1-C, 2-C, 3-C to A, 4-C to A, 5-C to A, 7-C to A, 8-C, 10-A. 12-C, 13-C.

7.26.6 NORI/*Porphyra sp.*

Description - Filmy sheets to 12 inches; red-brown; transluscent.

Habitat - Occurs intertidally on rocks, weir posts, wharves and subtidally on rocks.

Commercial Utilization - Potential exists for development of this alga for exportation to Japan.

Distribution and Abundance (Figure 7.26.6) - 2-P, 8-P, 9-P, 11-C, 12-C, 13-P.

7.26.7 UNIDENTIFIED SUBTIDAL FILAMENTOUS BROWN ALGAE

Description - Multi-branched, small stem, hair-like, from holdfast; to 3 feet; golden-brown to dark brown, tentatively identified as *Desmerestia sp.*

Habitat - Occurs subtidally to 30 feet; on rock.

Distribution and Abundance (Figure 7.26.7) - T1-C, T2-C, 1-C, 4-C, 5-C, 9-P, 10-A, 13-C.

7.26.8 KELP, DEVIL'S APRON/*Laminaria sp.*

Description - Long, flat, heavy frond from heavy stem and holdfast; to 10 feet; golden brown-dark brown. Species recorded for this area include: *L. longicruris, L. saccharina* and *L. digitata.*

Habitat - Occurs from low water to 10 feet on rocks.

Commercial Utilization - Used in food and chemical production (Kombu and Alginates). Stocks at the Wolves would not appear to be adequate for commercial development.

Distribution and Abundance (Figure 7.26.8) - T1-P, 1-A, 2-P to A, 3-C to A, 4-C to A. 5- P to A, 7-P, 8-P to C, 9-P, 11-C, 13-A, 14-A.

7.26.9 SEA COLLANDER/*Agarum cribrosum* (Bory)

Description - Kelp-like frond perforated with circular holes; distinct heavy midrib and holdfast; to 2 feet; golden, dark brown.

Habitat - Occurs occasionally in tide pools on rock. Most common subtidally to 40 feet on rocks and ledge.

Distribution and Abundance (Figure 7.26.9) - T1-P, T2-C, 1-A, 2-C, 3-C, 4-C, 5-C, 7-P, 8-C, 10-C, 13-P, 14-C.

7.26.10 WINGED KELP/*Alaria esculenta*

Description - Oval midrib; thin transluscent main blade; smaller blades below large blade; branched holdfast; to 5 feet; golden, dark brown.

Habitat - Occurs occasionally in tide pools on rock; most common subtidally from low water to 5 feet on rocks.

Commercial Utilization - Although edible no market exists at present (Neish, 1973).In any event, due to the limited extent of its habitat, this algae would be difficult to harvest at the Wolves and would not, in our opinion, sustain a fishery.

Distribution and Abundance (Figure 7.26.10) - T1-A, T2-A, 1-A, 3-C, 4-C, 5-P to A, 7-C, 8-A, 9-P, 10-C to A, 11-C, 13-A, 14-A.

7.26.11 ROCKWEED/*Ascophyllum nodosum* (Le Jolis)

Description - Multi-branching narrow fronds with many air bladders; to 4 feet; light to dark green.

Habitat - Most common intertidal algae. Occurs on rocks; does not grow subtidally.

Commercial Utilization - Although used to produce rockweed meal, no harvesting currently takes place due to lack of market. The rugged nature of the coast would probably preclude harvesting at the Wolves.

Distribution and Abundance (Figure 7.26.11) - T1-A, T2-A, 1-A, 2-A, 3-A, 4-A, 5-A, 7-A, 8-A, 10-A, 11-A, 12-A, 13-A.

7.26.12 ROCKWEED/*Fucus vesiculosus* (Linnaeus)
F. spiralis (Linnaeus)
F. edentatus (De La Pylaie)

Description -

F. vesiculosus - Flat, multi-branching fronds with air bladders; to 18 inches; solid single holdfast; yellow, green-brown.

F. spiralis - Flat fronds; no air bladders; to 6 inches; solid single holdfast; yellow-brown.

F. edentatus - Flat fronds; no air bladders; to 18 inches; solid single holdfast; dark olive green-brown.

Habitat -

F. vesiculosus - The most common species, it occurs intertidally from a few feet from high water to within a few feet of low water.

F. spiralis - This species occurs in a narrow band a few feet from high water.

F. edentatus - This species occurs at and near low water on rocks.

Commercial Utilization - These species may be used in the production of rockweed meal. No harvesting presently takes place due to lack of market.

Distribution and Abundance (Figure 7.26.12) -

F. vesiculosus - T1-P, T2-C, 1-C to A, 2-C, 3-C, 4-C, 5-C, 7-C, 8-C, 12-C, 13-C.

F. spiralis - T1-A.

F. edentatus - 2-C, 3-C, 4-C, 5-C, 7-C, 8-C, 10-A, 11-P, 12-C, 13-C.

7.26.13 SEA LETTUCE/*Ulva sp.*

Description - This species resembles a lettuce leaf; to 18 inches; translucent green.

Habitat - Occurs intertidally in tide pools, mud flats, and on rock to low water. Also occurs, in some areas, subtidally on rock, to about 5 feet.

Commercial Utilization - Can be used as a seasoning but at present there is no local market.

Distribution and Abundance (Figure 7.26.13) - T2-P, 3-C, 4-C, 5-C, 7-P, 8-P, 9-A, 10-C, 11-P.

7.26.14 GREEN ALGA/*Spongomorpha sp.*

Description - Sponge-like; encrusting on rock; to 2 inches and more; green.

Habitat - This species occurs at or near low water on rock.

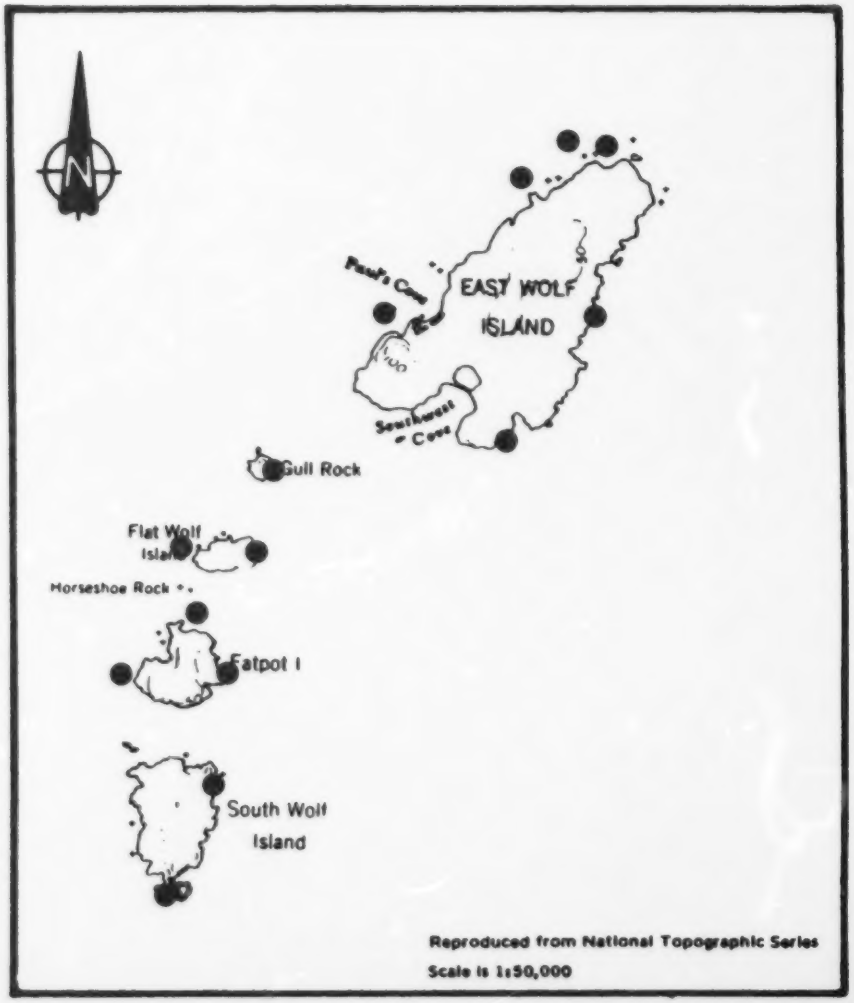
Distribution and Abundance (Figure 7.26.14) - T2-P, 1-C, 2-C, to A, 5-P.

7.26.1
DISTRIBUTION OF IRISH MOSS (Chondrus)

THE WOLVES ISLANDS

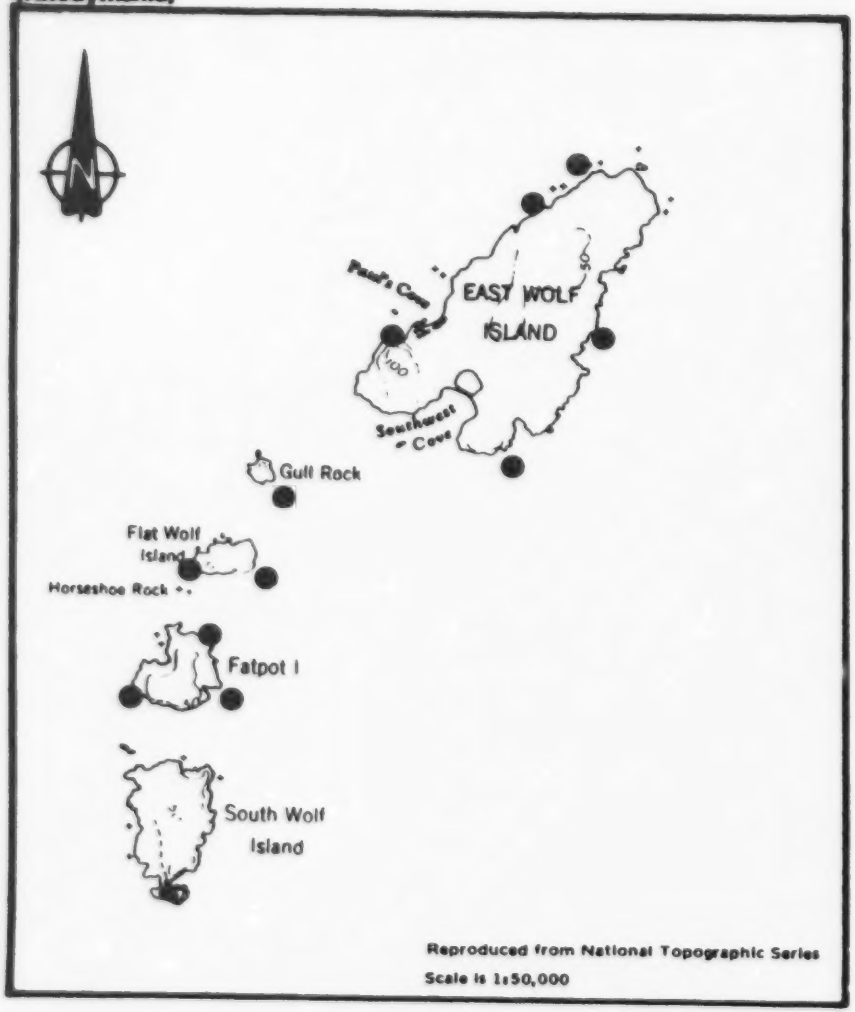
7.26.2
DISTRIBUTION OF "CORAL" ALGA (Lithothamnion)

THE WOLVES ISLANDS



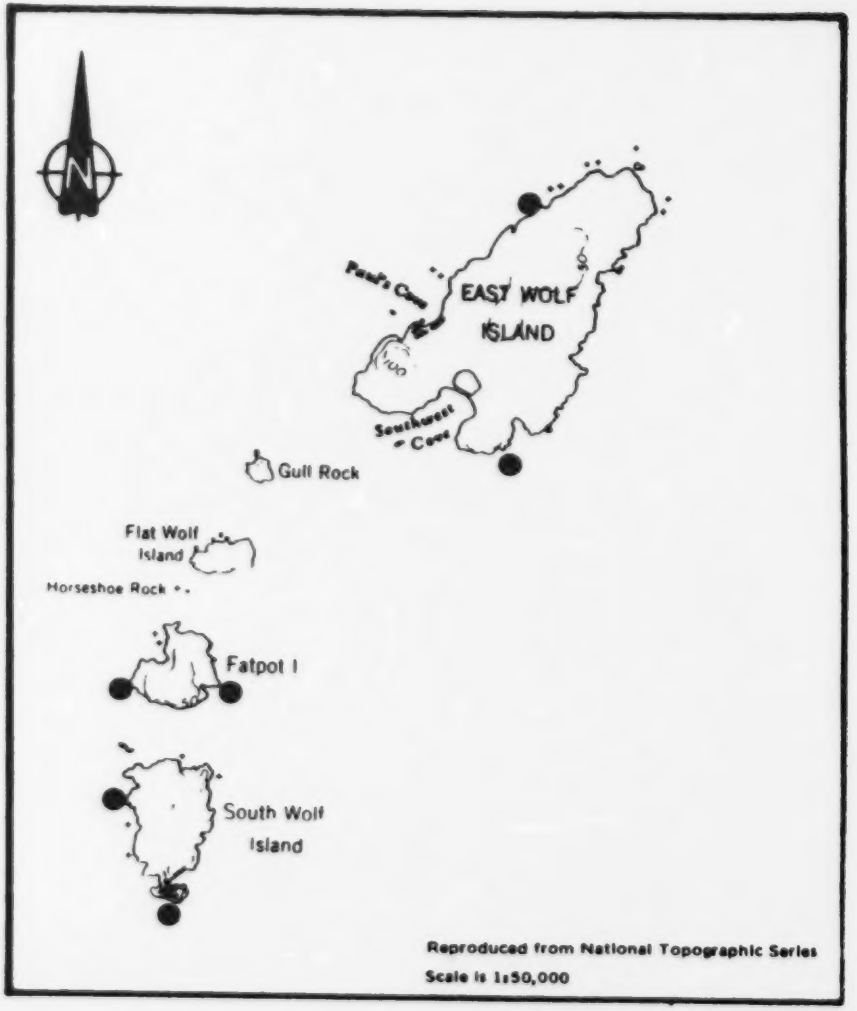
7.28.3
DISTRIBUTION OF DULSE
(Rhodymenia)

THE WOLVES ISLANDS



7.28.4
DISTRIBUTION OF PHYCODRYS

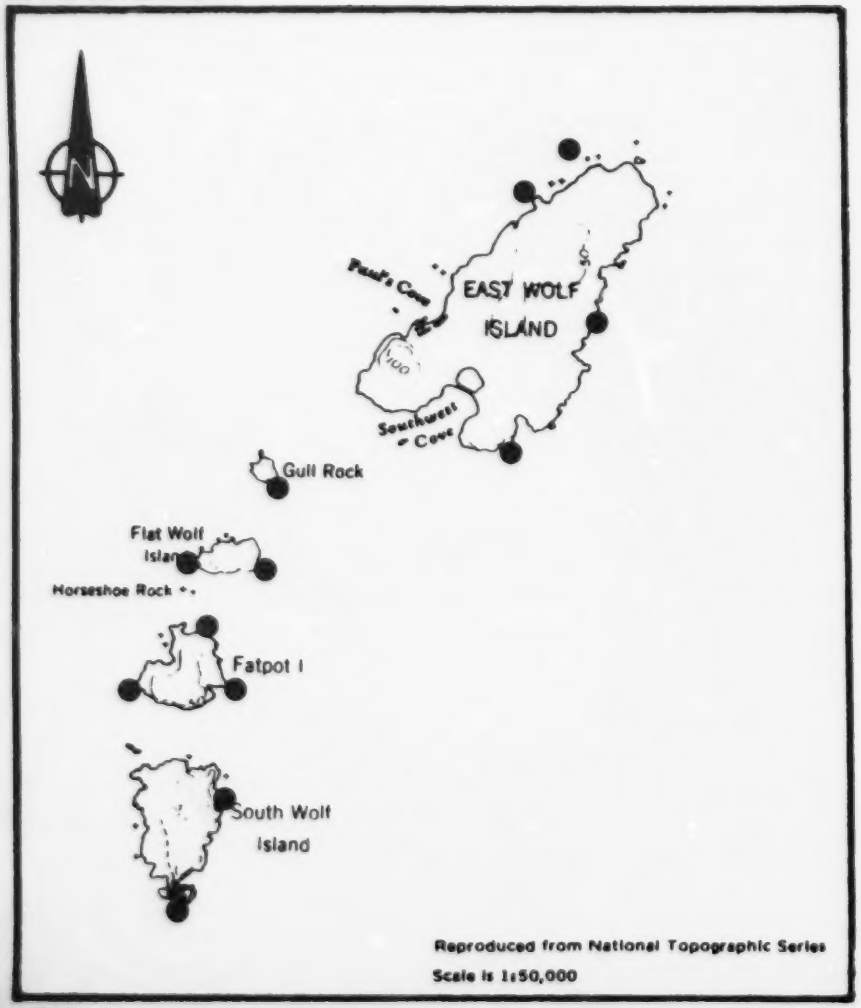
THE WOLVES ISLANDS



7.26.5

DISTRIBUTION OF POLY-SIPHONIA LANOSA

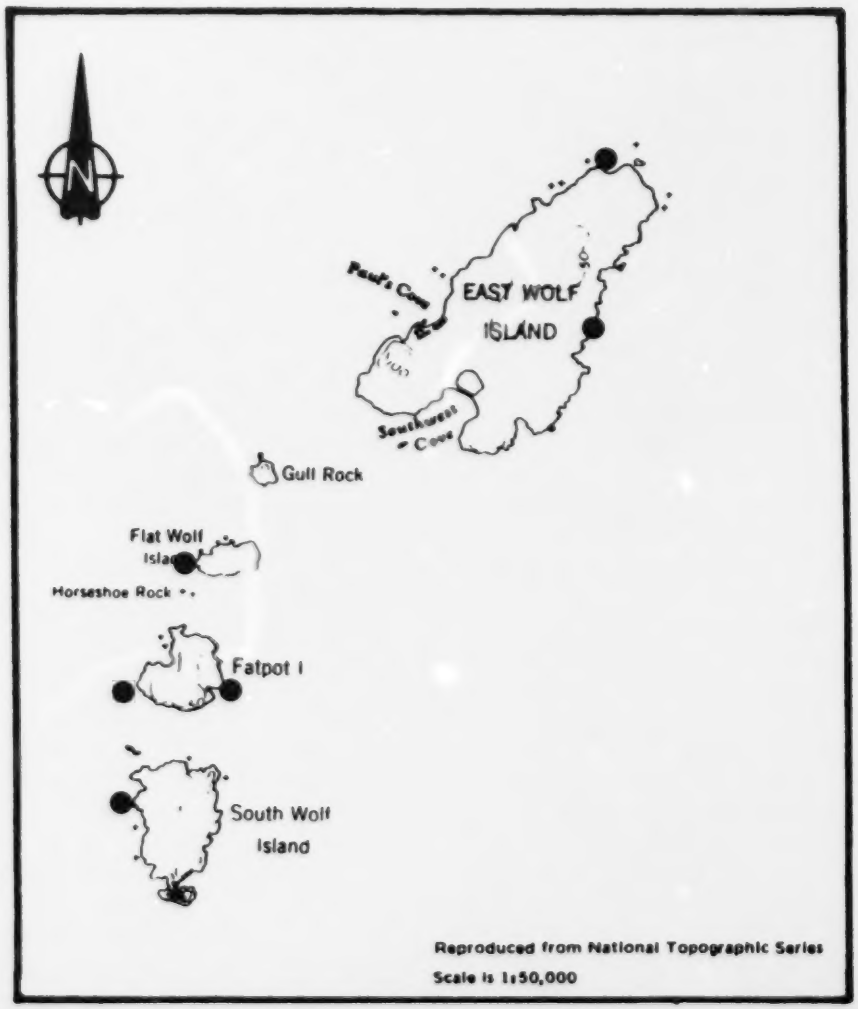
THE WOLVES ISLANDS



7.26.6

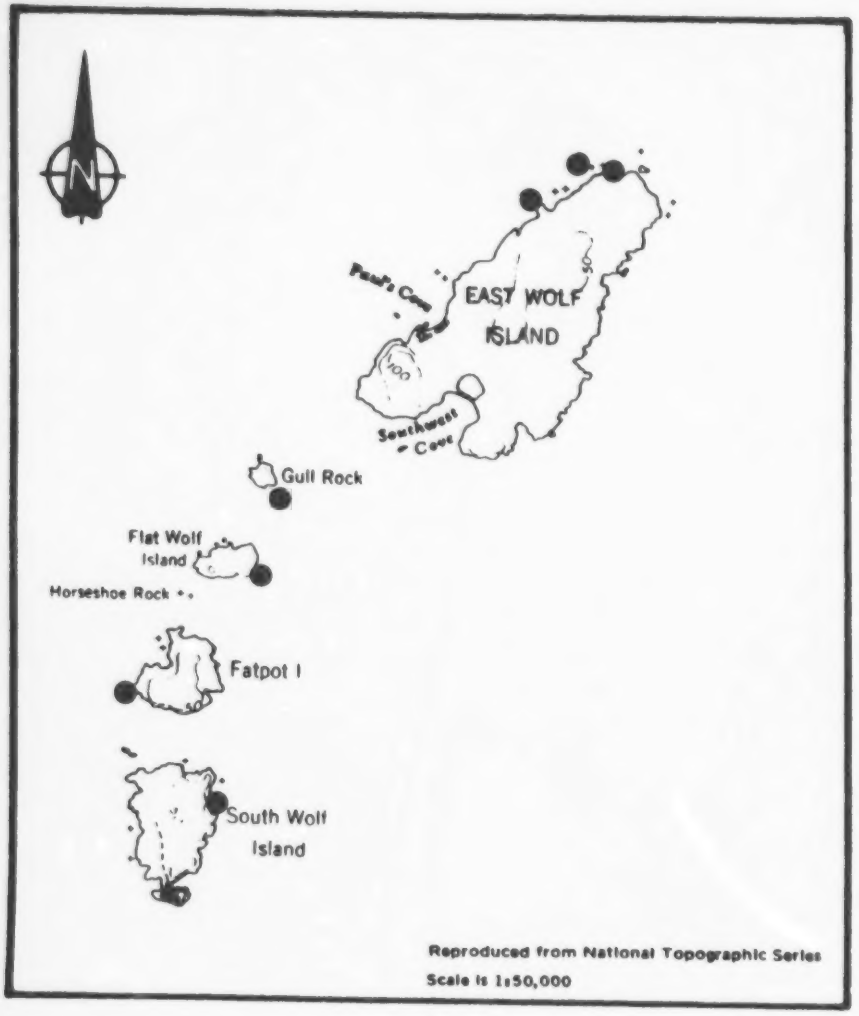
DISTRIBUTION OF PORPHYRA

THE WOLVES ISLANDS



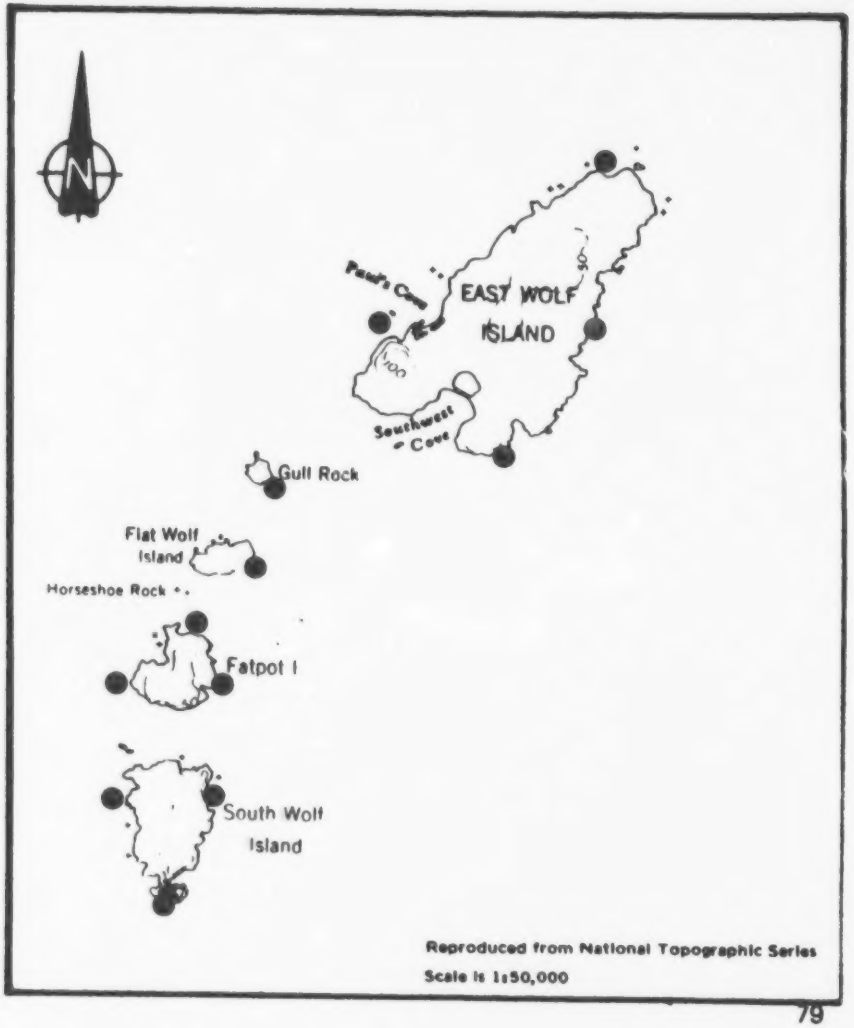
7.26.7
LARGE FILAMENTOUS BROWN ALGA

THE WOLVES ISLANDS



7.26.8
DISTRIBUTION OF KELP (Laminaria)

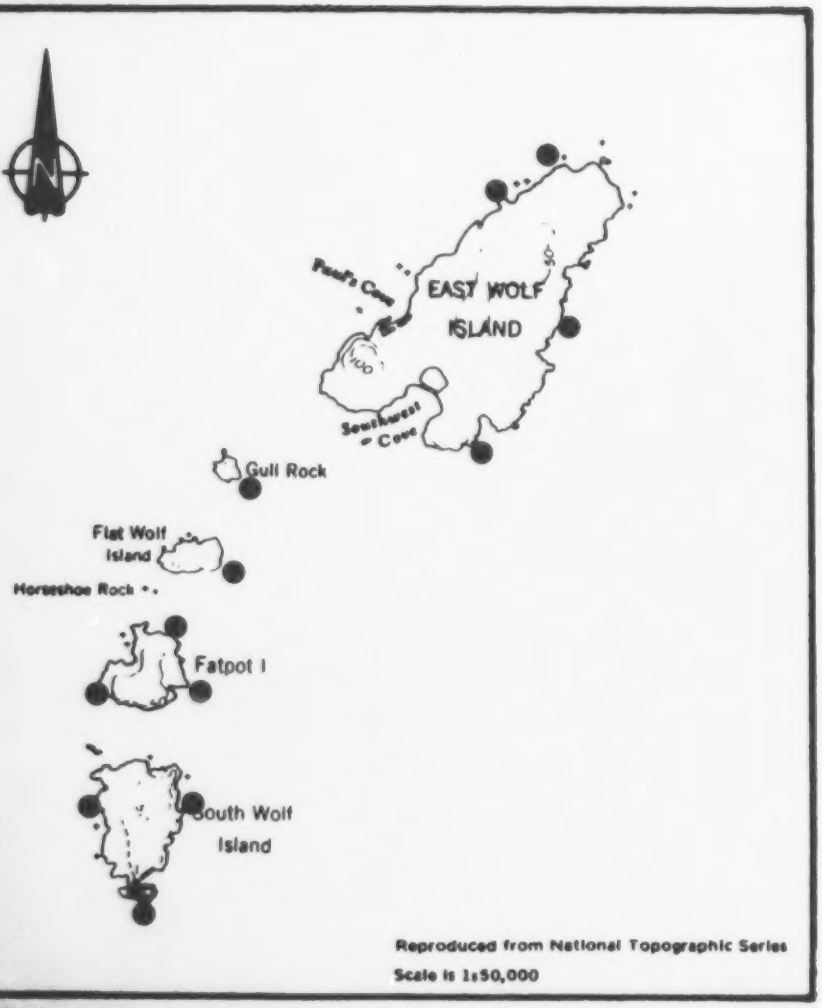
THE WOLVES ISLANDS



26.9

DISTRIBUTION OF SEA COLANDER (Agarum)

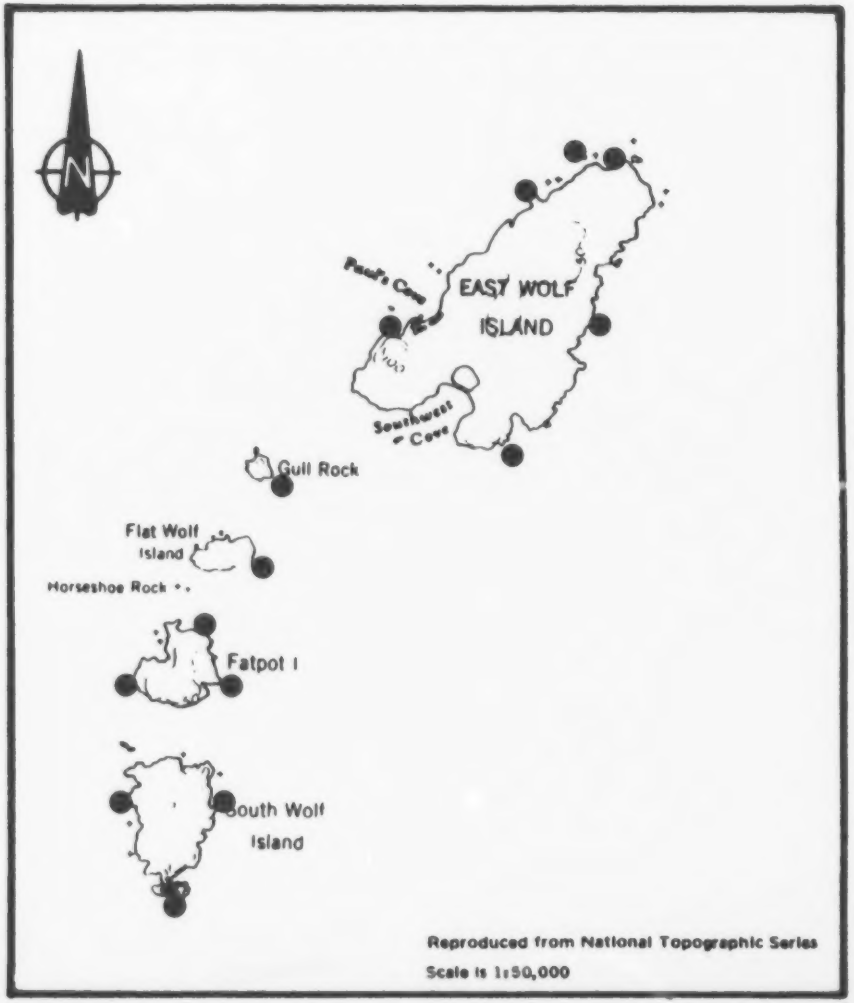
THE WOLVES ISLANDS



7.27.10

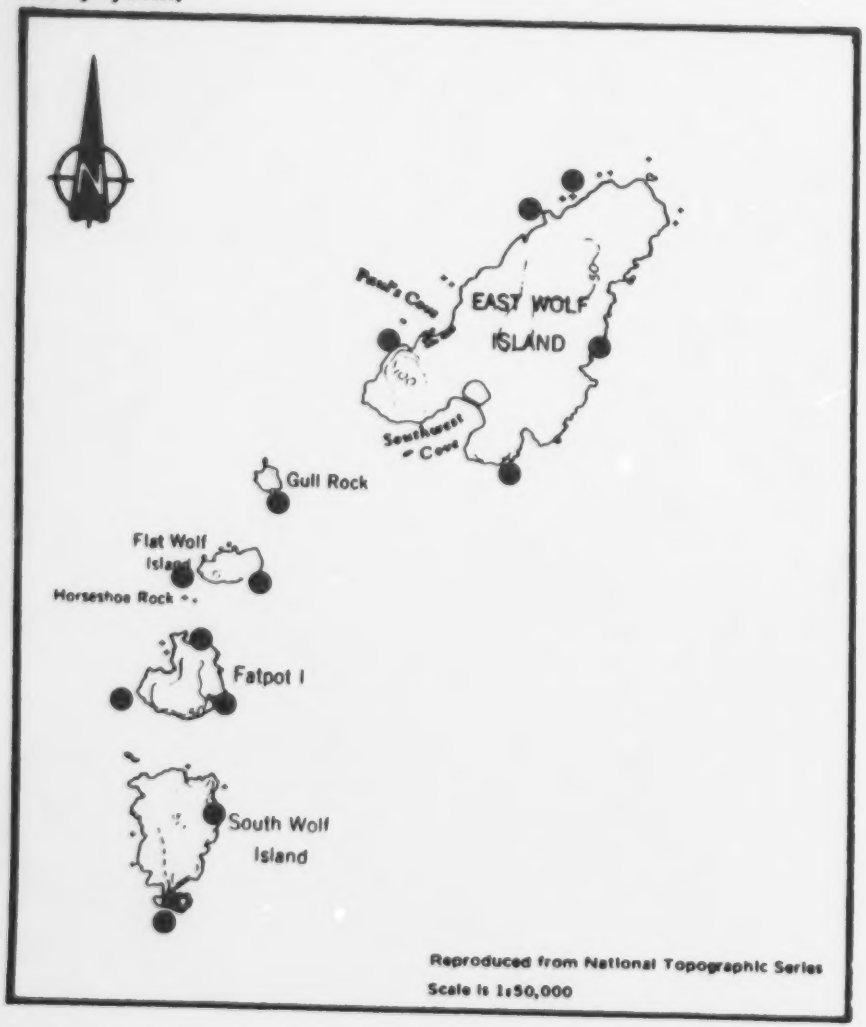
DISTRIBUTION OF WINGED KELP (Alaria)

THE WOLVES ISLANDS



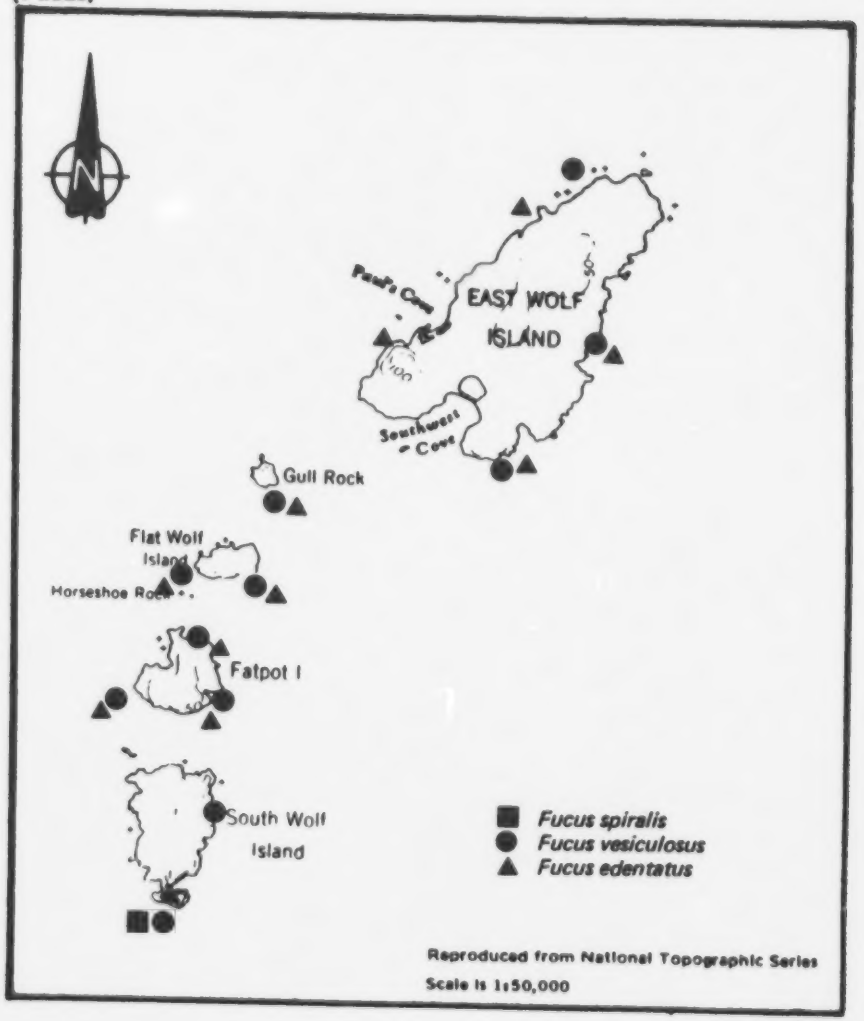
7.26.11
DISTRIBUTION OF ROCKWEED (Ascophyllum)

THE WOLVES ISLANDS



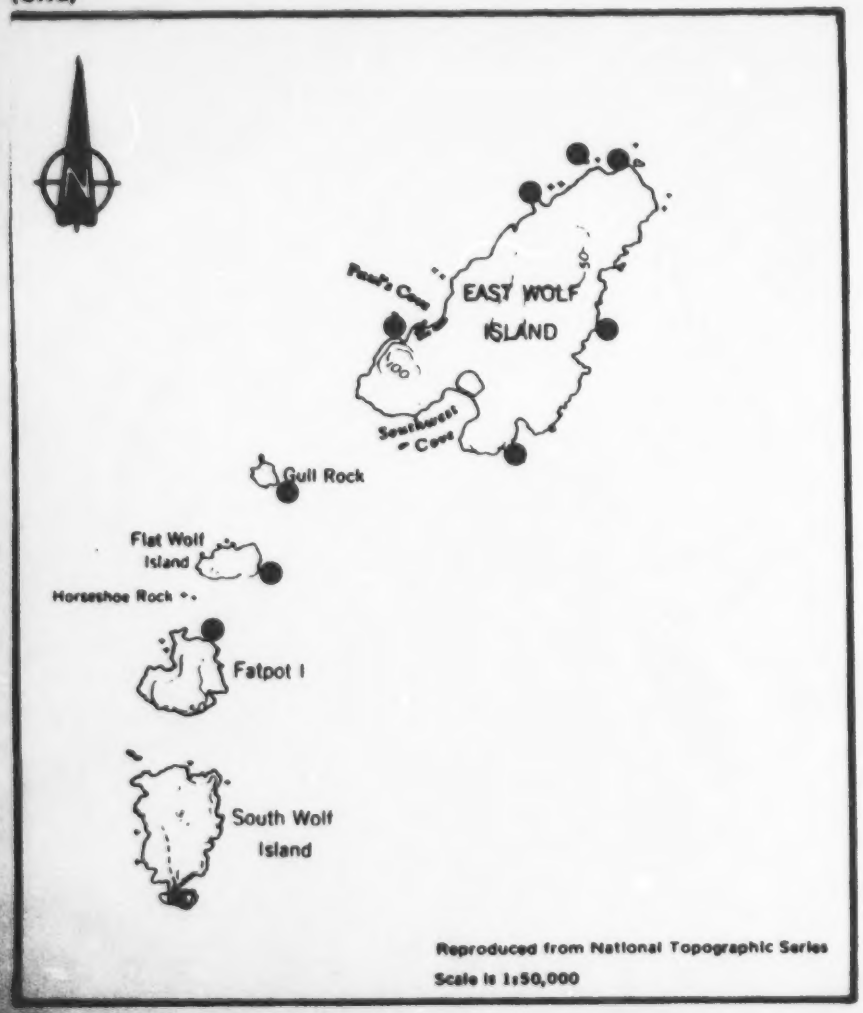
7.26.12
DISTRIBUTION OF ROCKWEED (Fucus)

THE WOLVES ISLANDS



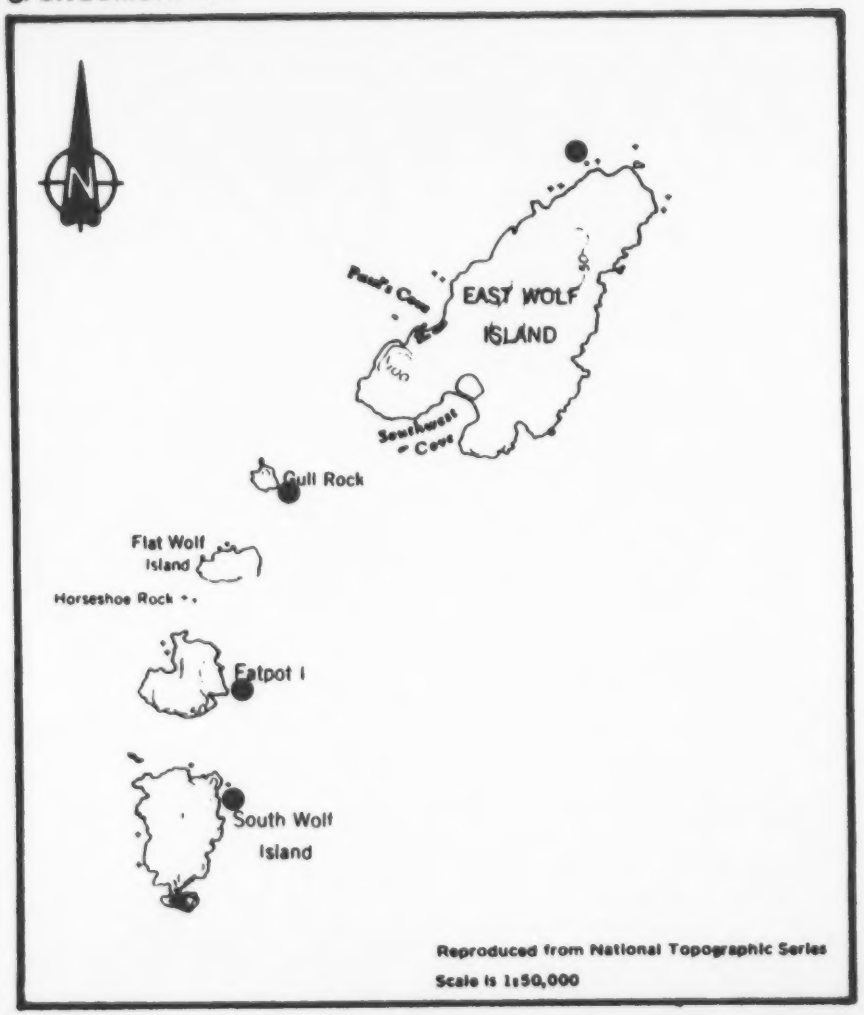
7.26.13
DISTRIBUTION OF SEA LETTUCE (Ulva)

THE WOLVES ISLANDS



7.26.14
DISTRIBUTION OF SPONGOMORPHA

THE WOLVES ISLANDS



8. ECOLOGICAL EVALUATION

8.1 INTRODUCTION

The Wolves are essentially a group of hard granitic blocks sitting well out in the Bay of Fundy. Because of their physical characteristics, their location and the deep surrounding waters, the islands have inshore, pelagic and bathyal characteristics which make them more or less unique in the Bay of Fundy.

8.2 COMMUNITIES OF THE SHALLOW-WATER OR NERITIC ZONE.

The shallow-water benthic communities at the Wolves are similar to those found on ROCKY EXPOSED SHORES elsewhere in the Bay. As can be seen from Figure 8.2.1 the dominant assemblage of plants and animals grow on rock substrate. The second most important group are animals which occur on mixed bottom types. At the Wolves, most of these occurred on rocky bottom. Mud and sand dwelling organisms are poorly represented in terms of both distribution and abundance. The breakdown of species in terms of substrate was as follows:

	% OF TOTAL SPECIES
Rock Substrate Organisms	65.0%
Mixed Substrate Organisms	22.4%
Sand/mud Substrate Organisms	12.6%

Figures 8.2.2 and 8.2.3 show the typical zonation and mode of occurrence for rocky shore species at the Wolves as determined by transects.

An analysis of species occurring at the Wolves, in terms of feeding method, revealed the following composition:

	% OF TOTAL
Plankton/Suspension feeders	59.6%
Predators/Scavengers	24.5%
Grazers	15.9%

These figures indicate that the plankton level at the Wolves supports a diverse and abundant community which utilizes this food. Predators and scavengers are at about the expected level. The occurrence of grazers seems to be low for an area which supports so much plant growth. However, although not a diverse group, many species which do occur there, do so in abundance.

8.3 COMMUNITIES OF THE PELAGIC ZONE.

Because of their offshore location, the Wolves are surrounded by truly pelagic habitat and most pelagic invertebrates, fish, birds and mammals will be found there at one time or another. In fact, many of the unusual records for such pelagic species as the Great White Shark, Pothead Whales, etc. come from fishermen working this area.

As discussed in a later section, the area is important to the fishery as one of the key localities for commercial pelagic species such as cod, haddock, mackerel, herring, squid, etc.

8.4 COMMUNITIES OF THE DEEP WATER OR BATHYAL ZONE

MRA's staff have collected deep water benthic animals from the area around the Wolves. This community, although poorly known, supports a diverse fauna which includes many invertebrates not found in shallow water (brittlestars, mudstars, benthic squid (*Rossia*), octopus, commercial shrimp (*Pandalus borealis*)) as well as numerous species of unusual fish.

8.5 PRODUCTIVITY

An analysis of productivity in terms of the distribution and abundance of benthic invertebrates indicates a level of productivity comparable to the Head Harbour Passage area (Figure 8.5.1). It is our view that areas which support large populations of benthic invertebrates generally have an elevated plankton base due to the additional contribution made by local organisms. An analysis which is currently underway by MRA suggests that such areas are usually associated with important fishing areas in adjacent waters. It appears that areas with elevated plankton levels "feed" these areas. The Wolves conform to this idea and it would appear that the shallow water areas of the islands contribute significantly to the local fishery.

FIGURE 8.2.1 PERCENTAGE OCCURRENCE AND SUBSTRATE RELATIONSHIPS FOR MARINE ORGANISMS RECORDED AT THE WOLVES ISLANDS, N.B.

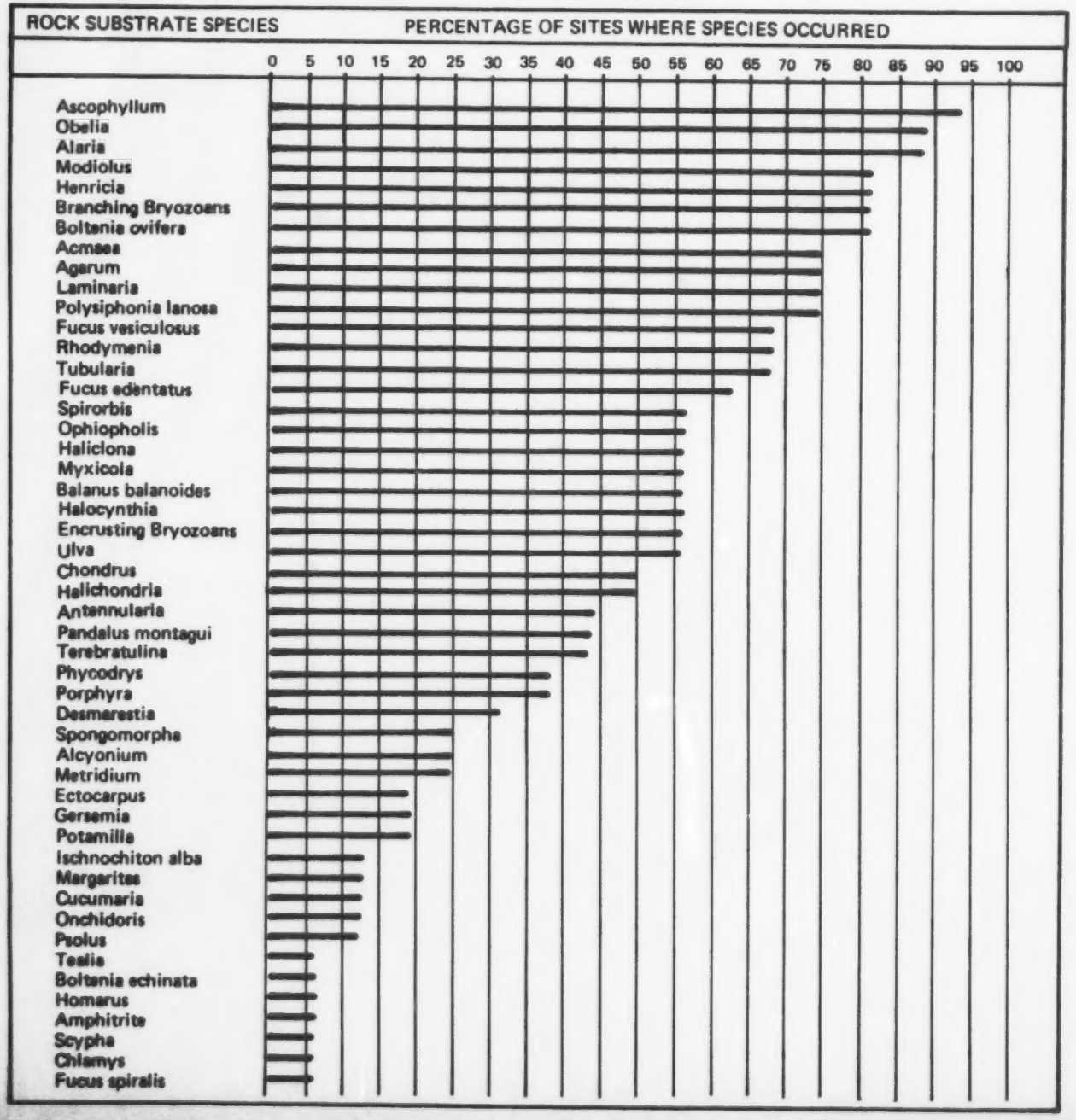
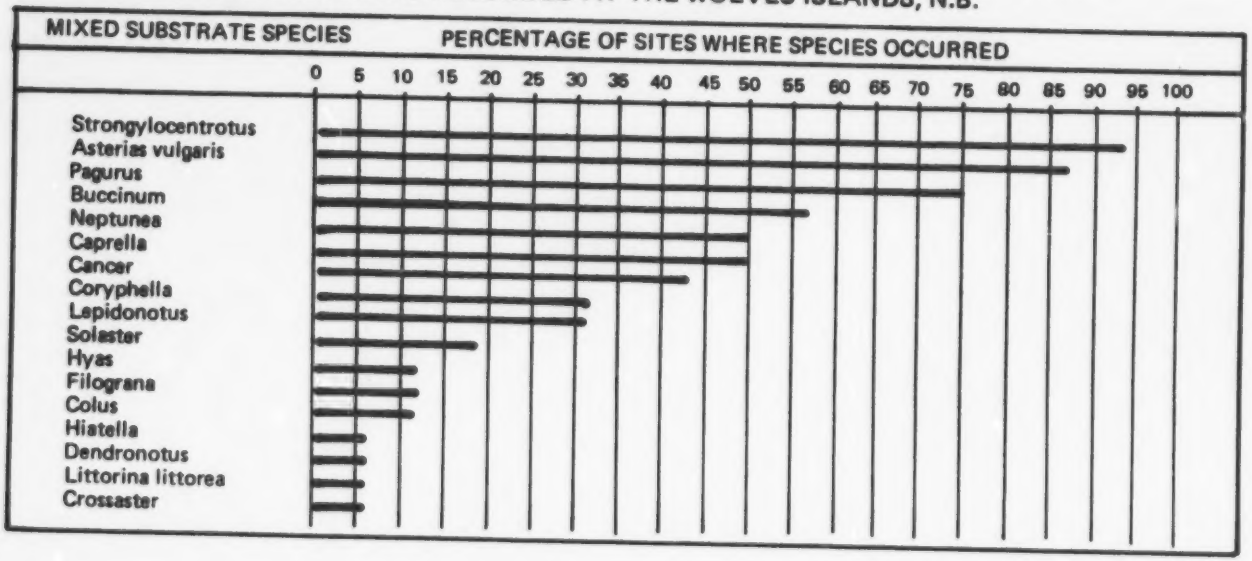
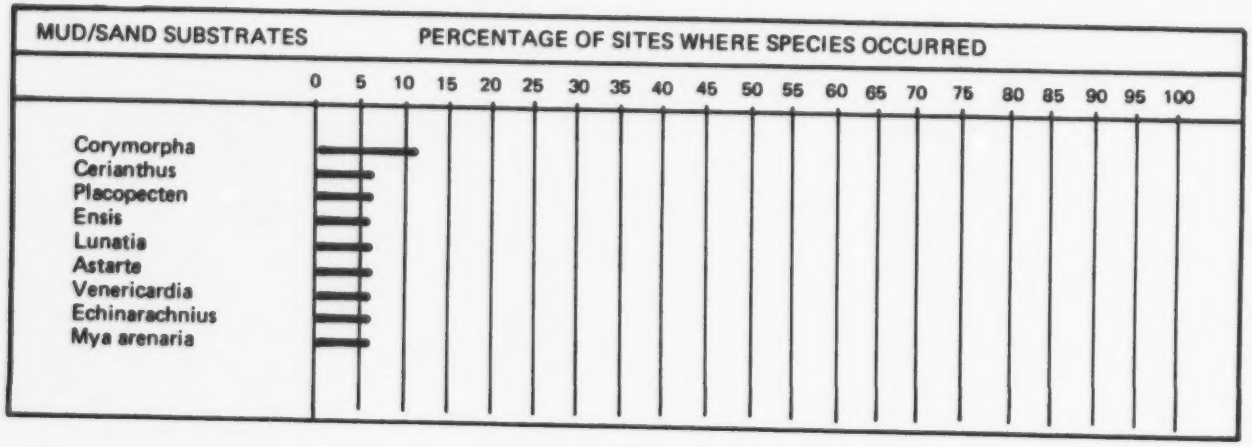


FIGURE 8.2.1 (continued) PERCENTAGE OCCURRENCE AND SUBSTRATE RELATIONSHIPS FOR MARINE ORGANISMS RECORDED AT THE WOLVES ISLANDS, N.B.





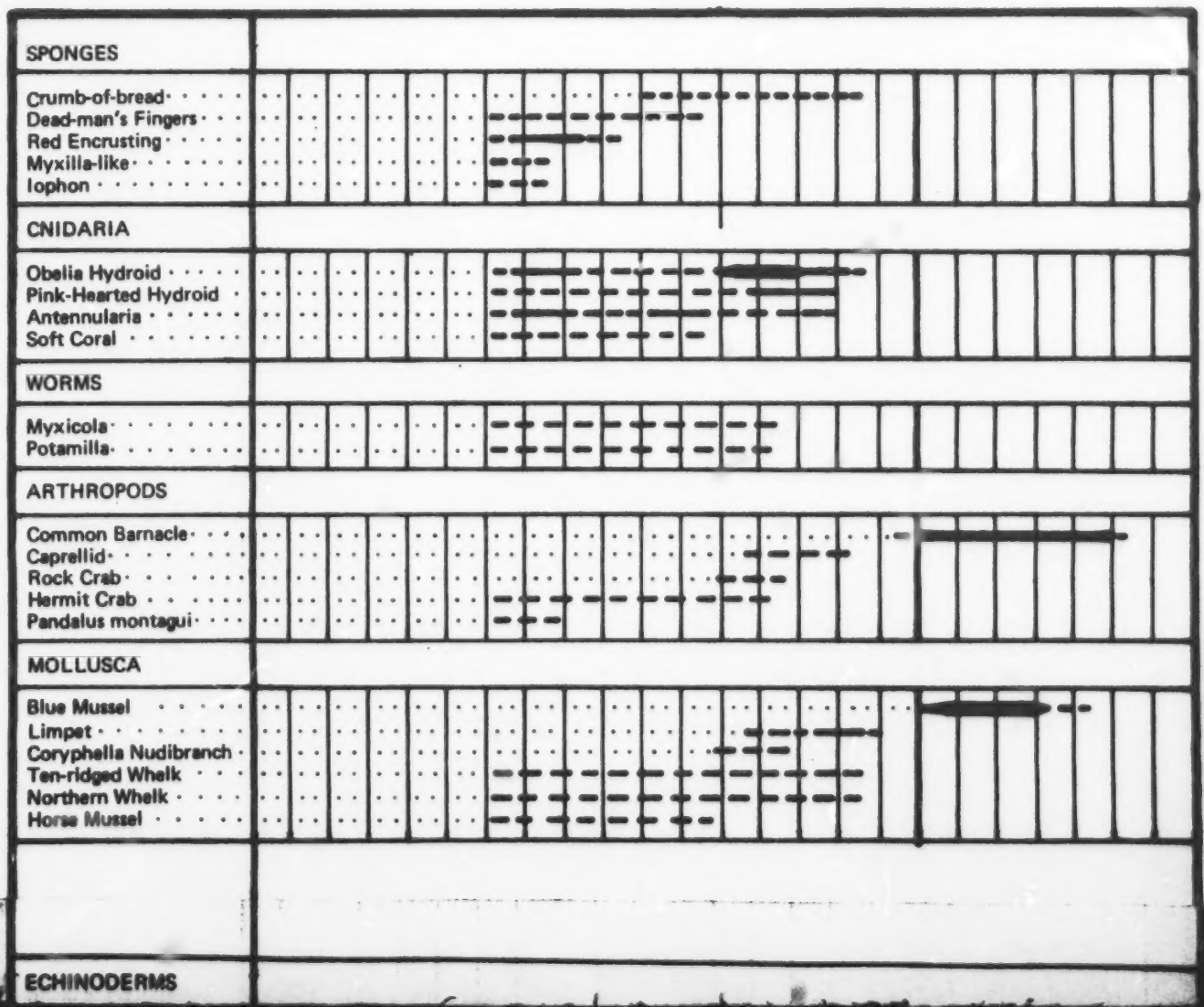

SPONGES
Crumb-of-bread
Dead-man's Fingers
Red Encrusting
Myxilla-like
Iophon
CNIDARIA
Obelia Hydroid
Pink-Hearted Hydroid
Antennularia
Soft Coral
WORMS
Myxicola
Potamilla
ARTHROPODS
Common Barnacle
Caprellid
Rock Crab
Hermit Crab
Pandalus montagui
MOLLUSCA
Blue Mussel
Limpet
Coryphella Nudibranch
Ten-ridged Whelk
Northern Whelk
Horse Mussel
ECHINODERMS

FIGURE 8.2.2. TRANSECT T1, SOUTH WOLF ISLAND N.B.

PRESENT
COMMON
ABUNDANT

ROCKWEED (*Fucus spiralis*)
COMMON BARNACLE
ROCKWEED (*Ascophyllum nodosum*)
BLUE MUSSEL
ALARIA
AGARUM
DEADMAN'S FINGERS
COMMON STARFISH

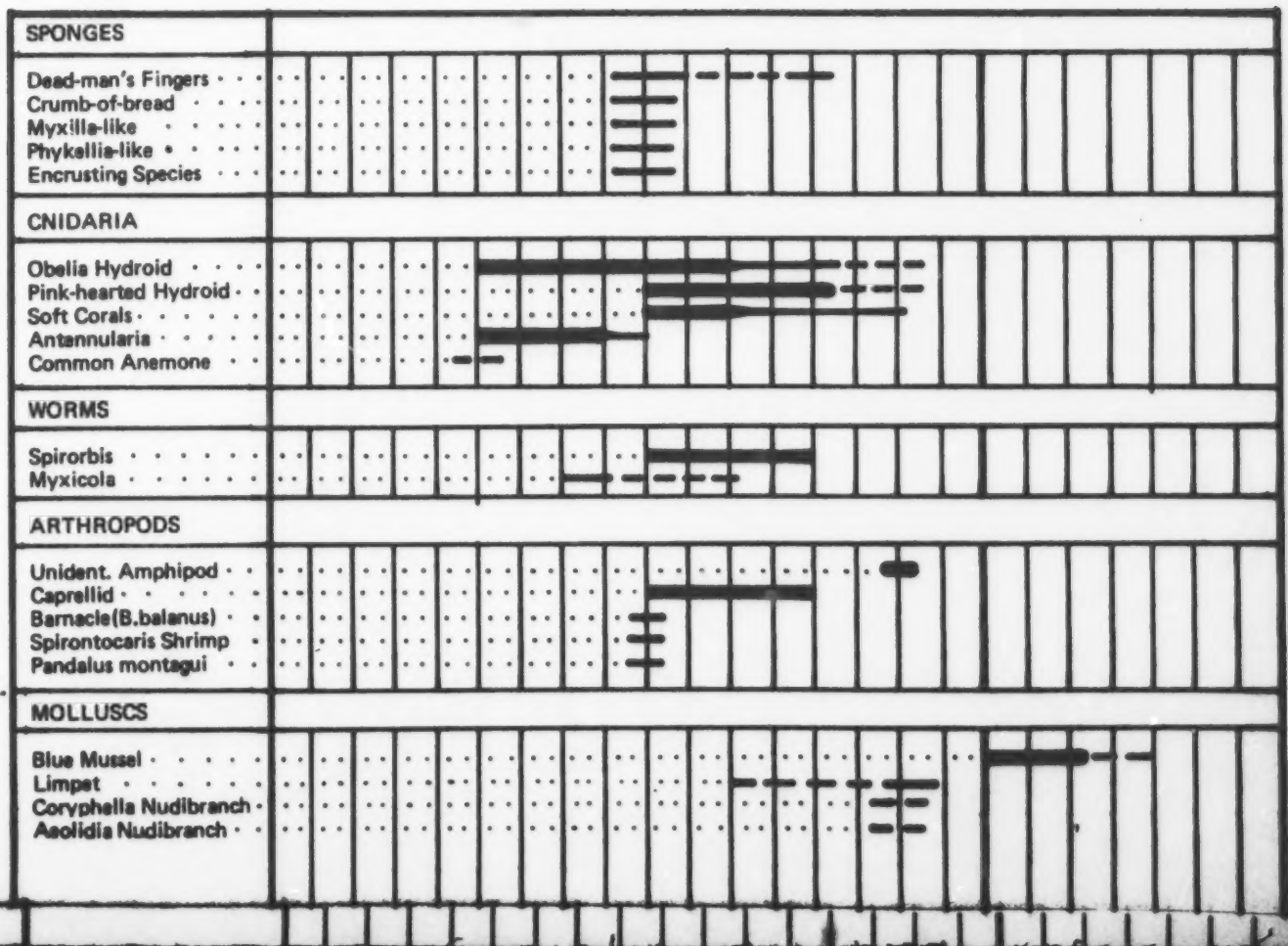
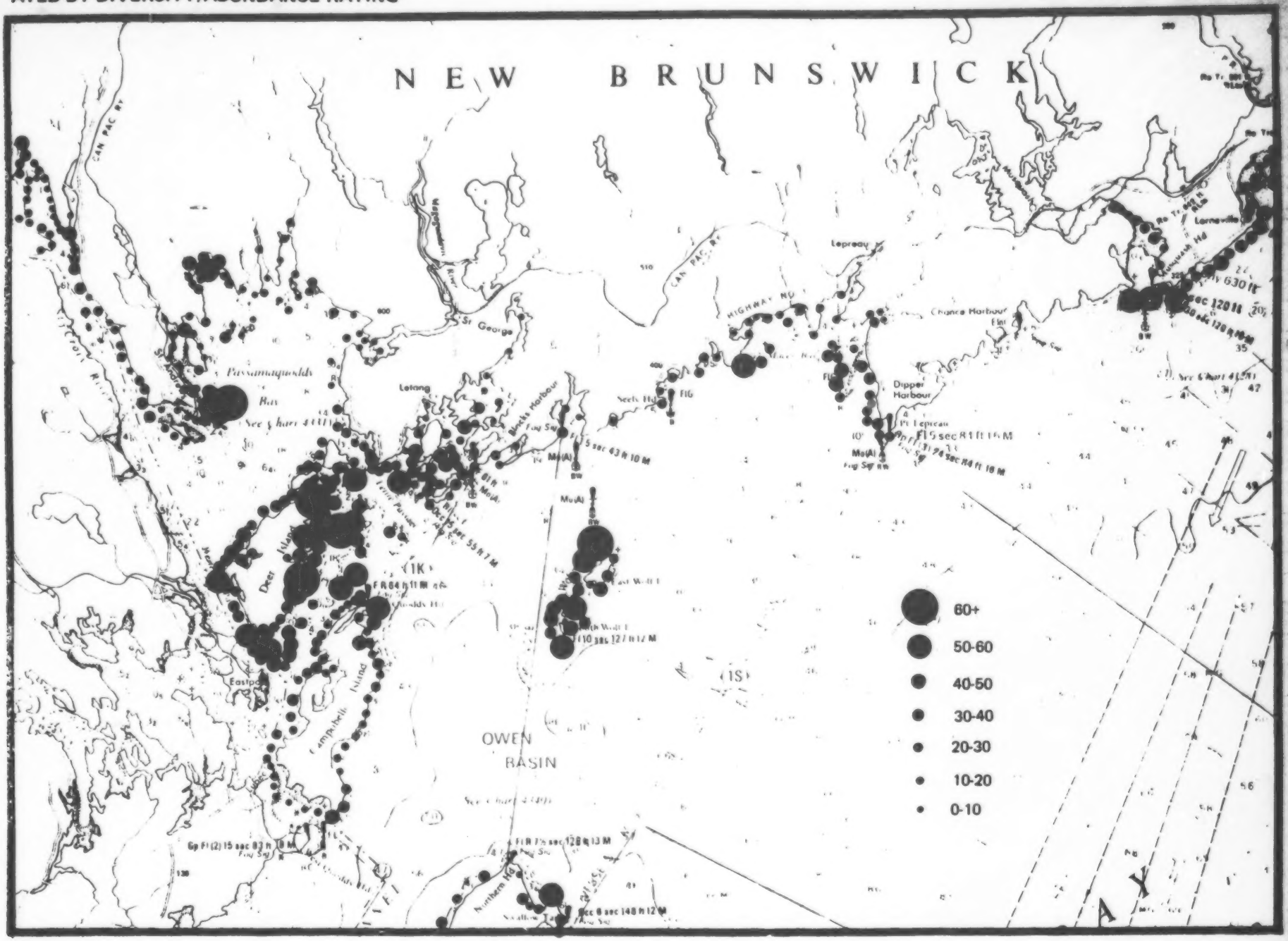

SPONGES
Dead-man's Fingers
Crumb-of-bread
Myxilla-like
Phykellia-like
Encrusting Species
CNIDARIA
Obelia Hydroid
Pink-hearted Hydroid
Soft Corals
Antennularia
Common Anemone
WORMS
Spirorbis
Myxicola
ARTHROPODS
Unident. Amphipod
Caprellid
Barnacle(B.balanus)
Spirontocaris Shrimp
Pandalus montagui
MOLLUSCS
Blue Mussel
Limpet
Coryphella Nudibranch
Aeolidia Nudibranch

FIGURE 8.2.3. TRANSECT T2, EAST WOLF ISLAND, N.B.

8.5.1 KEY AREAS OF PRODUCTIVITY AS INDICATED BY DIVERSITY/ABUNDANCE RATING



9. THE FISHERY

9.1 GENERAL DESCRIPTION OF THE INDUSTRY

There are presently three major fisheries in the study area: herring, lobster and groundfish. Scallops are harvested occasionally and a shrimp fishery existed until stocks were depleted.

The Wolves are a part of Statistical District 53 (Fisheries and Marine Service). However, the waters are utilized by fishermen from Districts 50, 51, 52 and 53.

No processing or research establishments exist on the island and there are no permanent residents. During the weir season 2-3 families live on East Wolf Island in order to efficiently tend their weirs.

9.2 ANNOTATED LIST OF SPECIES

INTRODUCTION

The study area is a part of Statistical District 53 (Pea Pt. to Pt. Lepreau) and, as a result, landings are difficult to determine.

This flaw in statistical gathering methods has been recognized and programs have been initiated at the Biological Station in St. Andrews, N.B., to document catches statistically in relation to actual catch locality. Presently this program includes herring (Groom and Iles, per. comm. 1977, 1978) and the offshore fishery (Scarratt, per.comm., 1978). These programs will be of considerable value in the decision making process, particularly as it relates to the establishment of conflicting industrial developments in key fisheries areas. Unfortunately, current statistical data were not made available for inclusion in this report.

MOLLUSCA

9.2.1 COMMON PERIWINKLE *(Littorina littorea)* Figure 7.10.2 Periwinkles are present in the study area, but do not occur in sufficient numbers to justify a fishery operation.

9.2.2 NORTHERN WHELK *(Buccinum undatum)* Figure 7.10.3 - This species is relatively common in the study area and would probably support a small fishery if markets were available.

9.2.3 BLUE MUSSEL *(Mytilus edulis)* Figure 7.10.6 - The edible blue mussel is common in the study area but is generally too small for harvesting. This species,though commonly eaten in European countries, suffers from a poorly developed market in North America.

9.2.4 HORSE MUSSEL *(Modiolus modiolus)* Figure 7.10.6 - Although common in the study area the horse mussel has never been marketed in the Canadian Maritimes (Caddy et al 1974). This species can be harvested by hand on low spring tides, dragged subtidally or harvested by scuba divers.

9.2.5 GIANT SEA SCALLOP *(Placopecten magellanicus)* Figures 7.10.5 and 9.2.1 - Scallops are harvested by draggers on an occasional basis in the study area. No landings for this species are available.

9.2.6 SOFT-SHELLED CLAM *(Mya arenaria)* Figure 7.10.7 - No fishery for this species exists in the study area due to lack of suitable habitat (mud flats).

9.2.7 SQUID *(Ilex illecebrosus)* - Squid were not recorded during the field survey but are occasionally abundant in the study area and have been occasionally fished (Pendleton, per. comm. 1977). Should a steady market develop,the study area would be an important harvesting area for this species (Figure 9.2.2).

ARTHROPODA

9.2.8 COMMERCIAL SHRIMP *(Pandalus borealis and P. montagui)* - Both species are present in the study area and were heavily fished in the years 1968 to 1973 (Figure 9.2.3). Large landings were recorded during these years from the study area, but none have been recorded in recent years.

9.2.9 AMERICAN LOBSTER *(Homarus americanus)* - A good commercial fishery for lobster exists in the study area (Figure 9.2.4) with approximately six boats fishing yearly. Each boat fishes an average of 200 traps with 15 and 25 fathom lines. Some deep water fishing (over 40 fathoms) has been tried in 1978 (Groom per. comm. 1979). No landing data are available for the study area.

9.2.10 ROCK CRAB *(Cancer borealis)* Figure 7. 14.5 - Rock crabs are common in the study area. However, due to lack of market, this species is not currently being harvested. Some lobster buyers started purchasing rock crabs during the 1978-1979 season. However, whether or not this market will continue to develop is not yet known.

ECHINODERMATA

9.2.11 SEA URCHIN *(Strongylocentrotus droebachiensis)* Figure 7.16.2 - As indicated in a survey of the sea urchin roe industry (MacKay, 1976) a good market for sea urchin roe exists. Urchins are common in the study area but occur mostly on substrate unsuitable for dragging. A high price for this product would make other harvesting methods practical and, if roe quality is suitable, some harvesting might be done at the Wolves.

CHORDATA

9.2.12 DOGFISH *(Squalus acanthus)* Dogfish are seasonally common in the study area where they are an undesirable part of fish draggers catches. Although used in other countries as a food fish, no markets have been established at present for local catches.

9.2.13 SKATE *(Raja sp.)* - Skate are commonly caught by fish draggers in the study area, but no market currently exists for this species. They are commonly taken in substantial numbers with other groundfish (Figure 9.2.5).

9.2.14 ATLANTIC HERRING *(Clupea harengus harengus)* Figure 9.2.6 and 9.2.7 - The Atlantic herring is the most valuable fishery in the study area and landings from both weirs and purse seiners are available from Fisheries and Oceans, St. Andrews, N.B. There are presently eight weirs licensed in the study area and all but one of these operate shut-off twine in conjunction with the weir operation. Purse seiners operate throughout the islands during open season.

9.2.15 COD *(Gadus morhua)*
HADDOCK *(Melanogrammis aeglefinis)* - Cod and Haddock are fished commercially by otter trawl, longline and handline in the study area (Figure 9.2.5). While these are important commercial species, landings for the study are are unavailable as they are grouped with data for Statistical District 53.

9.2.16 POLLACK *(Pollachius virens)* - Pollack are present in the study area, but are not a major part of the ground fishery. No landings for the study area are available.

9.2.17 WINTER FLOUNDER *(Pseudopleuronectes americanus)* - Figure 9.2.5 - Winter flounder are fished commercially in the study area by fish draggers, but landings are unavailable as they are combined in data for Statistical District 53.

ALGAE

9.2.18 IRISH MOSS *(Chondrus crispus)* - Figure 7.26.1 - Irish moss is common in the study area, but has never been commercially harvested. According to Neish (1973). "Irish moss was found in quantities far too small to permit commercial exploitation in Charlotte County".

9.2.19 DULSE *(Rhodymenia palmata)* - Figure 7.26.3 - Dulse is common in the study area, but is probably not harvested because of the isolated location and rugged nature of the shore.

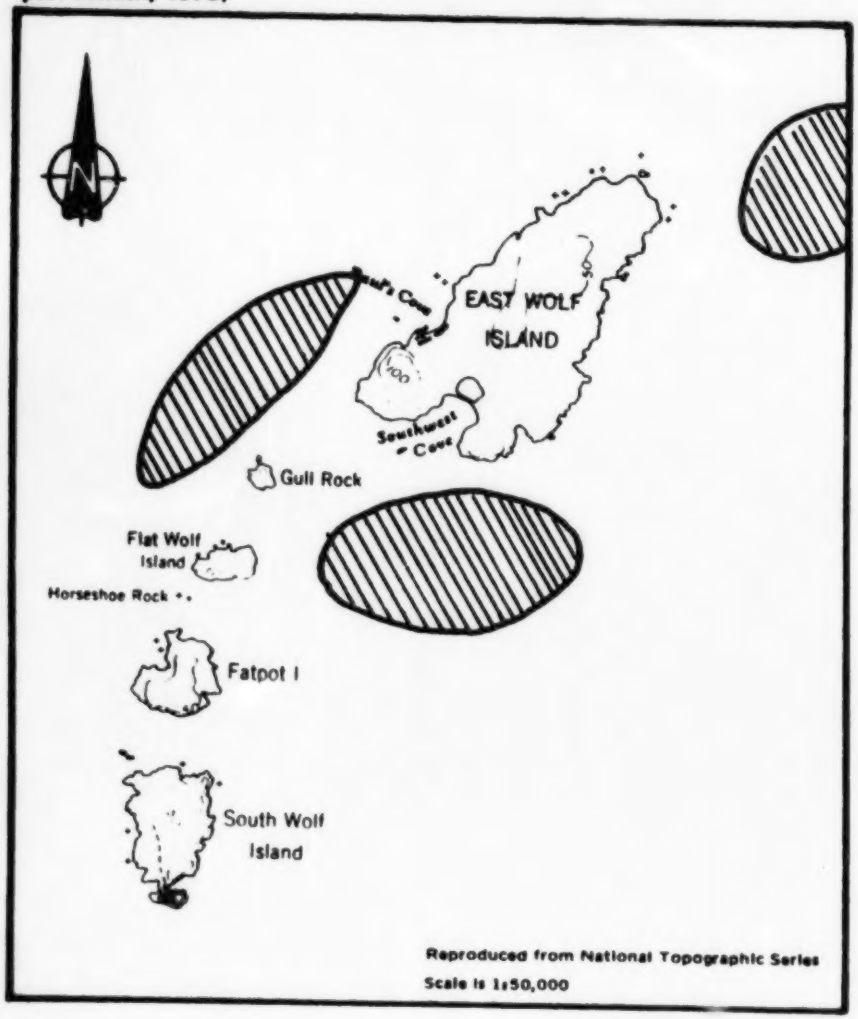
9.2.20 PORPHYRA SP. - Figure 7.26.6 - *Porphyra* is present in the study area and because of its high market value ($32.00 per dry pound in 1973, (Neish, 1973)) is worthy of examination for a harvesting or culturing program.

9.2.21 DEVIL'S APRON *(Laminaria sp.)* - Figures 7.26.8 and 7.26.10 Laminaria is common in the study area, but occurs in a narrow band from low water to a depth of approximately 15 feet. In our opinion this species is not sufficiently abundant at the Wolves to support a fishery.

9.2.22 ROCK WEED *(Ascophyllum nodosum)* - Figure 7.26.11 - Ascophyllum is an abundant species in the study area, but no harvesting takes place. The development of a seaweed industry would create a fishery for this species which can be used as rockweed meal. Because of the large stocks available at accessible localities, it is unlikely that the industry would center any major operation at the Wolves.

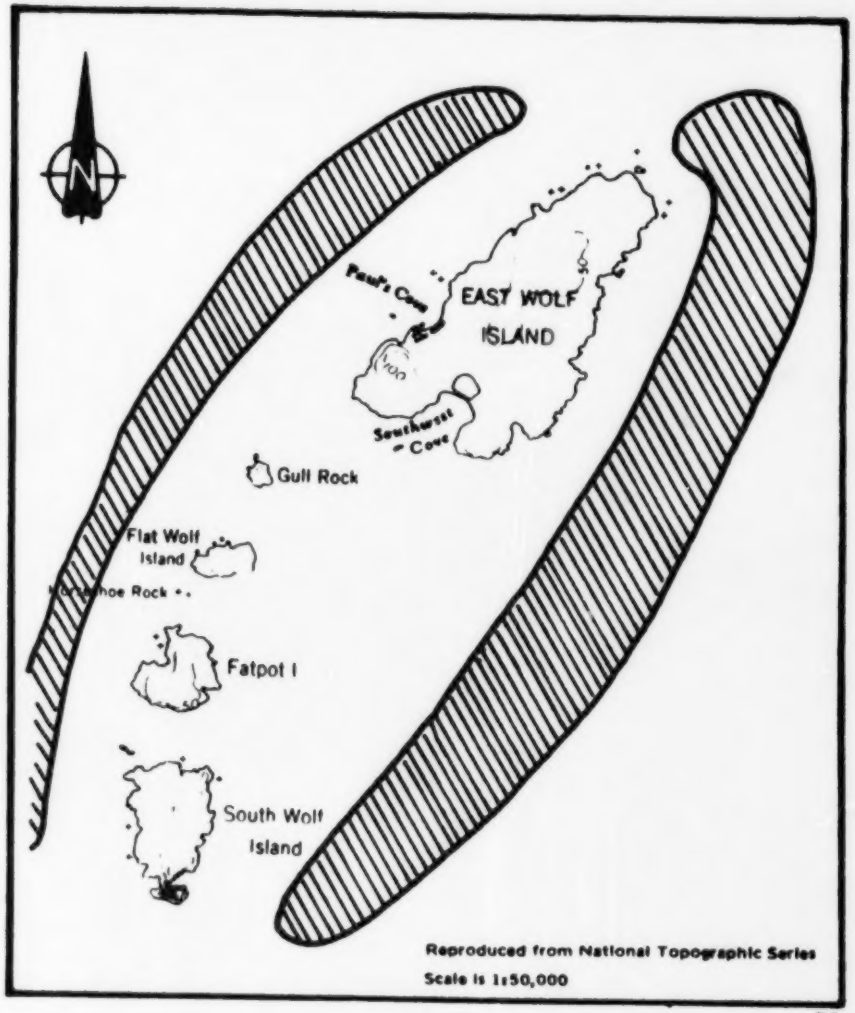
9.2.1
PRINCIPAL FISHING AREAS FOR SCALLOPS (K. Pendleton, per. comm., 1979)

THE WOLVES ISLANDS



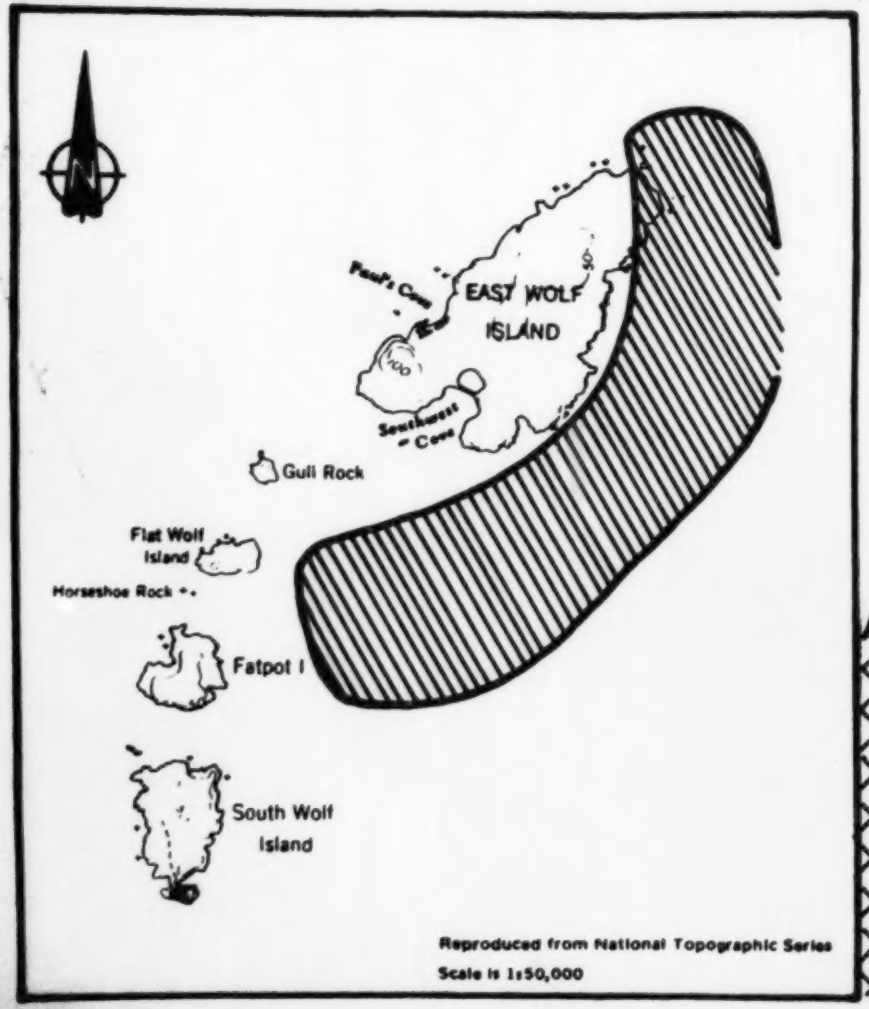
9.2.2
KNOWN SQUID FISHING AREAS (K. Pendleton, per comm., 1979)

THE WOLVES ISLANDS



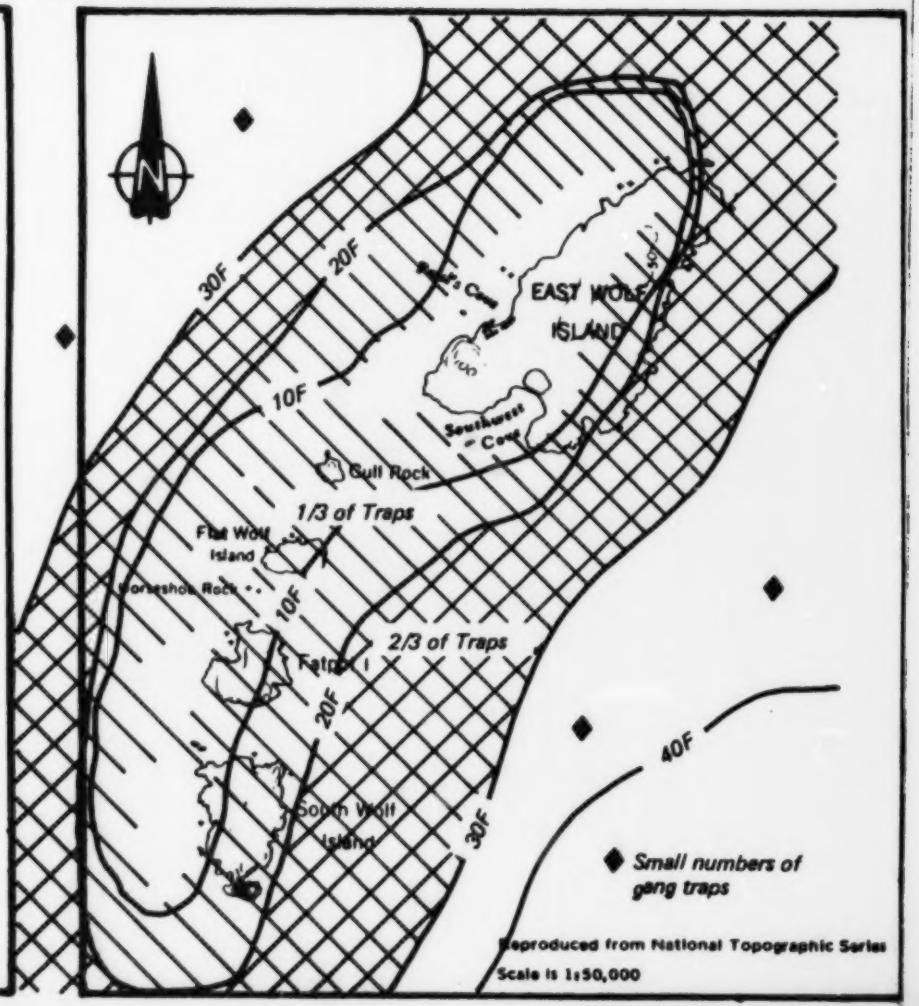
9.2.3
PRINCIPAL SHRIMP GROUNDS
(K. Pendleton, per. comm., 1979)

THE WOLVES ISLANDS



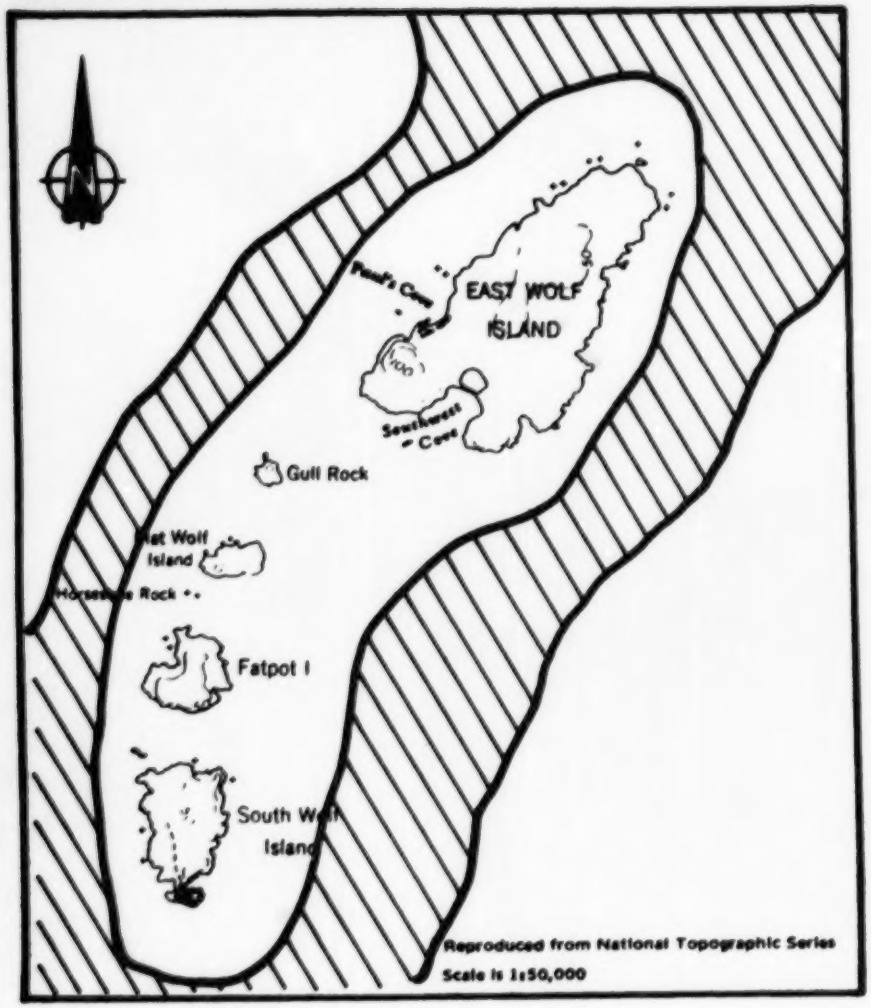
9.2.4
LOBSTER FISHING AREAS
(W. Hawkins, per. comm., 1979)

THE WOLVES ISLANDS



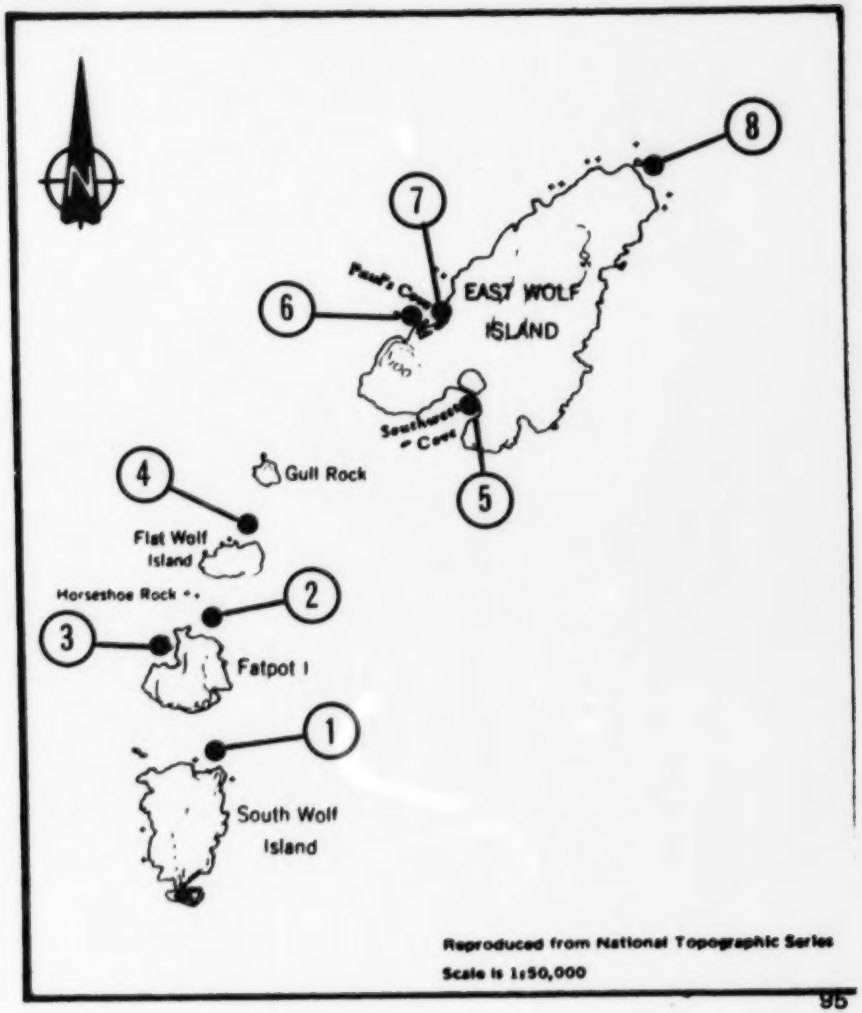
9.2.5
GROUNDFISHING AREAS
(K. Pendleton, per. comm., 1979)

THE WOLVES ISLANDS



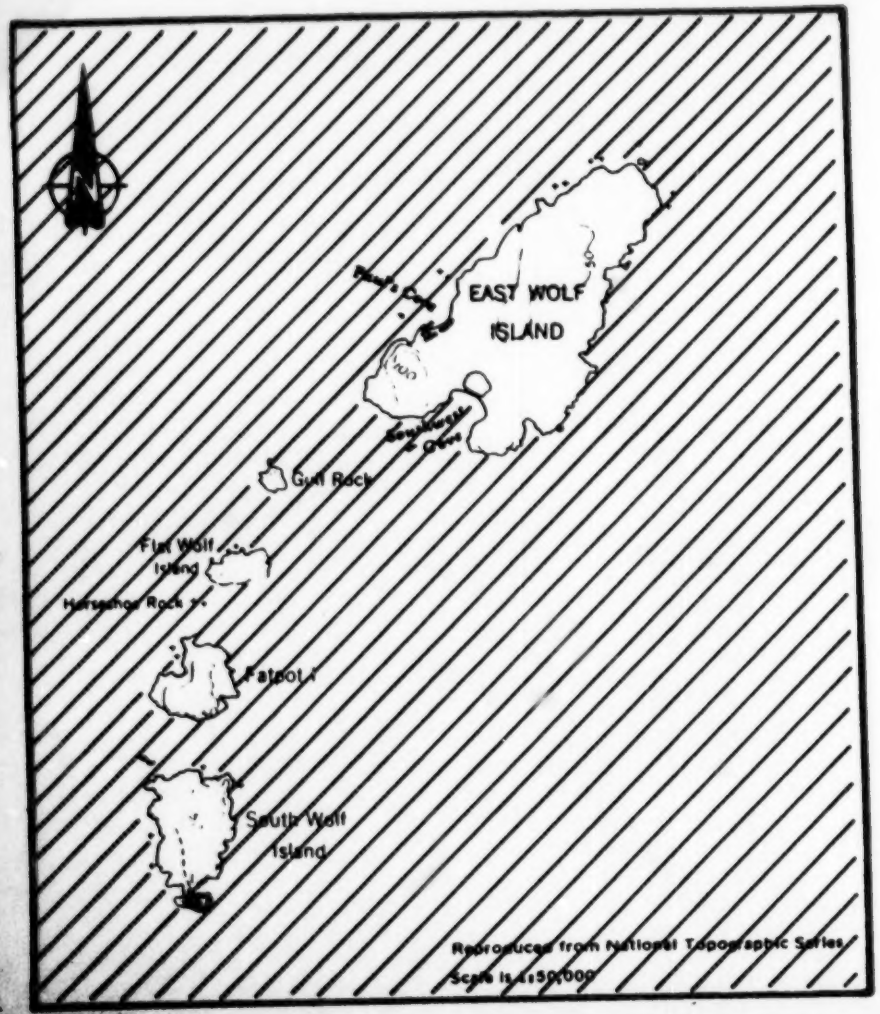
9.2.6
LOCATION OF HERRING WEIRS

THE WOLVES ISLANDS



).2.7
PURSE SEINING AREAS

THE WOLVES ISLANDS



10. ACKNOWLEDGEMENTS LITERATURE CITED

10.1 ACKNOWLEDGEMENTS. We wish to thank the following individuals for their assistance:

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Mr. R. Balabuck, MRA
Mr. J. Gilman, MRA
Mr. K. Pendleton, Deer Island
Mr. W. Hawkins, Beaver Harbour

10.2 LITERATURE CITED. Only literature referred to in the text is listed here. For additional references to the Area, See Volumes 1, 2 and 3.

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